WOOD AS A MATERIAL IN SHIPBUILDING

compiled by

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SHIPBUILDING

Washburn Brothers, Thomaston.

Notes by Miss Elizabeth Washburn (Mrs. Robert Walsh) based on talks with her father.

BUILDING A WOODEN SHIP OR LARGE SCHOONER
- Material -

It was customary to charter a schooner of about 200 tons (two masters were used). This vessel was loaded with a varied cargo at the wharf to proceed to Virginia to the James River or adjoining rivers to procure an oak frame to be brought back to Maine to build a vessel. T

To cut a frame it was necessary to have molds or patterns. These molds were pine boards made by a draftsman who had a model of vessel to be built. These molds were sent out on vessel mentioned together with more or less provisions such as barrels of yellow eyed beans for baking, barrel salt pork, and number of tons of baled hay for the oxen. A complete camp was also taken including boards and all in order to build at once on arrival for men to live in. On the deck a temporary house was built inside the rail from side to side to house about four yoke of oxen on the trip out. A number of the best carpenters would go out in the vessel, sleeping below deck on the hay, for a winter's employment cutting the frame. The man who contracted to cut this frame would go to Virginia before the schooner arrived to purchase from the owner (who might be a farmer), large oak trees what was needed for the frame. When the frame was completed about spring time the company who was to build the vessel would charter a small vessel to Virginia to load the frame and bring it to Maine where it was to be built.

For ceiling, planking, fouses, etc. we used pitch pine or Oregon pine (real name is Douglas fir). Outboard planking (varied on different sized schooners) was 4½ inches thick and varied from 30 to 50 feet in length. The keel is first thing made in the shipyard for a vessel. It is of two tier of oak about 14 inches square, length varies with length of vessel. The ends were scarfed together and then fastened, sometimes with iron, sometimes with treenails. Length of keels varied with size of vessel. All Washburn vessels father built during the war were 210 feet long, length of keel. At the bow end of schooner a large platform was built to make the frames on.

To make foundation for vessel it was necessary to have good-sized bed logs about 25 feet long and placed about 10 feet apart the entire length of vessel. On top of these bed logs were oak blocks 18 inches square on which the vessel's keel would rest. On the platform built near where the bow would be the frames were made. The frames were built in two (2) tiers and fastened together with oak or locust treenails. The frames were built flat on the platform, and most of them were shaped like the letter "U". The two tiers were kept apart by blocks of wood about 2 inches thick. When finished, the frame was about a yard wide and was slid down onto the keel; the first one almost the length of the vessel. There was a purchase on each end of the "U" that drew it up so that the frame set on center of "U" on the keel. This process was continued until the full frame of the vessel was up. These frames went nearly the entire length of keel but at bow and stern, to make the correct shape, there would be a space to fill. The next to be done was to make a stem for the bow to be placed on forward end of keel and a sternpost to be placed on after end of keel. Both of these were to be made the height of the frame. From the "U" frame forward to the stem on either side was put on what was called bow cants. These were fastened on the side of the keel. In front of the bow cants were "fillings" to complete the bow. The stern was done the same with stern cants and fillings as the bow. The stern post and counter timber

were made of oak. In between the counter timbers were juniper knees. The rudder post turned in a groove made in the length of the stern post.

The deck beams were made of pine (yellow or Oregon pine) going across the width of the vessel (pine 12 x 12 inches) the entire length spaced about 8 to ten feet apart. On these the deck was laid with spruce deck plank about 3½ to 4 inches square, fastened to the deck beams with galvanized spikes.

After the frames are up inside of vessel, the entire length on top of frames in the center "U" would be the keelson of pitch pine lumber 14 x 14 inches square and four in all, one on top of the other for the maine keelson. On either side of this was the sister keelson 10 x 10 inches square and three tiers high the entire length of vessel. the entire keelson was fastened with heavy bolt iron.

On either side on top of the frames, a water course was cut (a deep groove so to speak) so as the vessel leaked the water would work back forth and could be pumped out by pumps. Over this water course the ceiling was laid commencing at the sister keelson. This ceiling was made of pine and filled in the entire side of the vessel, the same fastened with bolt iron. The deck beams were fastened at the ends with hanging knee strake made of yellow pine 14 inches square, next that a 12 inch knee strake and underneath another 12 inch knee strake going the whole length of the vessel under each deck. These were fastened almost through the frames and also to deck beams with heavy bolt iron. Formerly in place of these knee strakes, knees of hackmatack were used under each beam.

Planking outside

Outboard planking they would commence at the keel, and the first three or four strakes put on the vessel would be the garboard strake. All planking on either ends of the vessel were steamed hot to get necessary curve or sweep in steam box so when put on vessel they wouldn't split. It was 4 or 4½ inches thick and 30, 40 or 50 feet long. One head planker and two helpers. (Bert Robinson, regular boss planker). Two strakes of waterways covered ends of frames. Top timbers of oak, and rail top piece of all.

top timbers

waterways

solid board outside

Stern planking made of lighter material but steamed. The name was placed here. After houses framed in spruce; interior finish was quartered oak. Contained Captains room, lavatory, 2 spare rooms, cook's and first mate's room, pantry, dining room, living room and chart room.

Forward house contained galley, engine room, sailors' focsle.

OneWASHINGTON B. THOMAS there was a refrigerator room in foreward house lined up with zinc.

The third house was built forward of the after house. Washburn Brothers did this on some. Atlantic Coast Co. on none. This third house contained mess room for the crew. The engine was used to work the pumps, weigh the anchors, hoist the sails and to work cargo when necessary. Sometimes the stevedores wanted to work their own engines on the docks for the cargo.

Masts and small spars came from Oregon. Masts were over 100 feet long (about 110 daddy's were). Finished they measured 28-29-30 inches diameter. The topmasts to go on top of these varied. The largest were 17 inches in diameter at base, 57 feet long (varied on different vessels). The bowsprit was Oregon pine; in the rough 50 inches square and 48 feet long.

The rigging was heavy wire rope with wood ratlines (formerly hemp rigging was used and hemp ratlines). All rigging, both wire and hemp, was tarred. The wire rigging was covered with cloth material and "sewed" with hemp marline and tarred. The tar was put on by hand (not brush) of riggers. Tar was almost as thick as molasses.

All seams on outside of the vessel were caulked with oakum, using about 3 tons to each vessel. The decks were all caulked with caulking cotton and each seam was run with warm pitch to keep out water. All seams (a number of years ago) on the outside of the vessel and on deck were covered with pitch but in late years the outside seams were filled with cement. The tops of houses and outsides were white lead caulked.

Eight or ten barrels of pitch to a vessel. When planking, rock salt from Turk's Island was poured in between the frames;as planked up more poured in using about two carloads per vessel. This was to preserve the vessel. Every two years or so the vessel was resalted from air strake down to bottom. Air strake was a space about _____ wide under first deck. If a vessel went to Turks Island for cargo of salt it could be resalted there for 7 cents a bushel. Turks Island salt is made from the wash of the sea on the island. It crystalizes and colored men shovel it up on piles. If a storm or gale of wind detrimental to vessel comes up the vessel has to put out to sea as there is no harbor or protection.

Different sizes of Manila rope are used. Takes about 5 tons of Manila of different sizes for running rigging for a large vessel.

A patent iron steering gear and iron wheel is used now where formerly blocks and tackles were used. Formerly a rounded barrel shaped wood piece 12 inches in diameter and 4 feet long; rope went over it and was pulled by the rudder tiller.

Now instead of oil lamps, electricity is used throughout for lights. Each vessel having about 42 lights. The engine rooms now give steam heat for all parts of the cabin.

When vessel was under construction, three large iron fresh water tanks were put in hold, lower edge resting on keelson. Fill in ports with fresh water. Forward tank used for engine room. Sails were raised by engine; formerly by sailors. Two hand pumps on main deck and one by mess house in case engine gave out, for leaks. These hand pumps were called Edison pumps. Eight men sailors on vessels; 16 sailors on the old ships. Steam heat in forecastle today; none then, only room for a stove.

Spanker boom on schooners was about 70 feet long. Center of boom was 17 inches in diameter. Rope that held end of boom to mast was topping lift. Jibboom went on top of bowsprit; was 70 feet long. Heel (lower end) of bowsprit into vessel.

Duck for schooner 5000 yards. (WASHINGTON B. THOMAS spanker had 900 yards of duck). Four men did the work on that). Hem 6 inches or so

a sail was called tabling.

Ordinary paint was used on topsides. Copper paint to keep worms from eating in hot climates. Copper paint was used instead of metaling. Too costly. Captain Sam Watts replanked in Rockland; 13 months [later?] replanked in the south.....4 inches thick.....like sponge. Ships going foreign sometimes...

Buy all oak owned by farmer, and usually agree to have three years to cut it. 300 tons measurement of oak for one schooner. One frame a year and usually all oak was used, Straight pieces timber and floor timbers in port hole and hold of vessel; all crooked pieces on deck which they couldn't get into port hole (bow port). Will HOFSES father, the ship carpenter, could go through yard and pick out pieces needed next for vessel; pieces marked in Virginia and man had to be clever to know what was needed next. Sometimes 10 frames made and put up in a day; 6 or 8 almost. Thirty or fourty treemails to one frame. For this oak treenails or framing treenails 14 inches long and one inch square. These cost less than locust treenails and came from Damariscotta. Treenails(locust) for vessel were different lengths; a box carload of nails. Treenails have to be free from sap or vessel would leak. Locust from south. Treenails have to be free from sap or vessel would leak. Treenails came 1 3/8 inch diameter; they were turned to 1½ inch diameter so as to fit tight. Oak treenails cost $7 per thousand. Took 90 tons of bolt iron to fasten a vessel; various sizes 1½ - 1 1/8 inch diameter.

$1.50 a gallon for copper paint; ground copper put into ordinary paint, dark brown in color. Water line drawn in copper paint; run battens and run groove with timber marker. Took good men to do this and get right line.

LOTTIE drew 12 feet when loaded with lime. Big schooners drew 9 feet when loaded light; when loaded with pig iron or coal, 22 feet; lumber lighter.

Anchor chain 2 inch; each anchor has eighty fathoms on either side.

Anchors-about 5 tons each-ready up the harbor. Patent anchor on one side; old fashioned on other. Chain lockers or room. Compressors on deck would stop anchor chain.

Lermond in June storm-almost hurrican-had both anchors out, coal loaded. 4⅓ inch wire on anchor ring of old fashioned anchor broke. On patent anchor the shank broke. Vessel loaded with coal. Anchors $2800 chains cost on W.B.T. After wreck sold $1800 Portland on wrecker, Staten Island. Chester, Pa.-patent anchor. Camden-old fashioned anchors.

$1 to $1.50 a ton on coal for freight in big vessel. That was low as now or take, but on smaller one would want $2.00. W.B.T. went all to pieces. This was its second voyage. Some wreckage washed ashore on island. Baltimore to Boston coal .. .. $2.25 a ton Tamp a to Boston Phosphate rock. Plaster up all air places on lime vessels if fire in hold. Carry 1000-1200 barrels of lime on small lime coasters. Captain Brown- etc. New York mostly. Some Boston-Portland. 22-25 lime coasters coming and going from here all the time.

Forelocks to fit bolt iron; spikes made bolt iron hold tighter.

MARTHA T. THOMAS- vessel built by Washburn Brothers in Watts yard down back of our house. Captain Wm. Lermond was captain. Each year he used to take what was called a "Christmas cargo" to South America, usually Rio de Janeiro. The cargo included apples, Baldwins as a rule as better for keeping purposes, and fresh vegetables. There was a layer of ice put in bottom of vessel and a layer along side. Along the side placed on the bilge (or side of barrel) and close to side row of ice was a row of barrels of apples, then a row of ice and so on. Over all another layer of ice and so on. As the ice melted on the voyage the water was pumped out with the vessel's pumps. One year he took 3000 barrels of apples among the cargo. At one year in South America the merchants retailed the apples for .28 a lb.

Charles Washburn-Grandpa (G. K.) Washburn's brother at 21 years was Captain of a ship sailing from Thomaston. He was also sailing master of the government boat ALBATROSS during the Civil War. He was ill with smallpox at Grandpa Washburn's home on Knox Street and nursed by Aunt Snow who had had the disease. He was ill in the small bedroom upstairs over the little room downstairs. Coffee was burned each day as a disinfectant. The family came and went as usual; the "5 boys" lived at home but each day was spent at Grandpa Washburn's sail loft (this side of Cushing's (?) Wharf and back of our house) and their dinner brought down to them from the house. All furniture in the sick room was burned. None caught the disease. Captain Charles Washburn later married Lizzie Hatch and died of t. b. in Rockland at 38 years. Daddy was possibly 9 or 10 years.

Captain Alfred Watts had smallpox in Cuba-was terribly ill, was kept packed in charcoal. One arm was always thinner than the other; the flesh never came back on it. He was ill in a schoolhouse there.

There was a dry dock in Thomaston, called when daddy was little Browns Drydock; vessels floated by the tide. When daddy was small there were 3 ship chandlery stores here; one at Dunn & Elliot's coal wharf, Boynton & ; oneback of our house in lower part of Grandpa Washburn's sail loft was the Jacobs, and one at Creighton's Wharf. Small coasting vessels used to tie up for the winter and in sprind fit out for sea at these stores.

No ship or vessel christened in Thomaston from bow platform, always done in bow on deck. No blessing asked, but plenty of rum. Steamers usually christened from platform as A. L. KENT of Crowell & Thurlow which we saw launched at Bath.

Some night launchings of vessels in Thomaston. Usually small ones (2 mast). The JOHN ELLIOT was one launched one evening (usually on the full of the moon, meaning a high tide), opposite where Sanford Hyler now lives (1935) on Water Street.

THOMAS S. DENNISON got half off when bow stuck on bridge work. Tide went out...bridge work cut away and vessel floated on high tide.

Washburn Bros. built - Elliot Washburn worked on the following (Ira Vinal master builder):
1. JOHN C. HAYNES 4 m. launched Dec, 1898; lost off Florida coast in hurricane; all hands, Capt. Hamilton and .... included.
2. MARY T. QUINBY 4 m. Sept. 21, 1899
3. JOHN E. DEVLIN 4 m. March 17, 1900
4. MARY E. LERMOND 3 m. June 28, 1900 lost.
5. JOSEPH B. THOMAS 4 m. Dec. 1900
6. JOSEPH G. RAY 4 m. Aug. 1, 1901
7. JAMES PIERCE 5 m. Dec. 28, 1901
8. HARRY T. HAYWARD 4 m. Aug. 20, 1902
9. WASHINGTON B. THOMAS 5 m. April 11, 1903; lost June 11, 1903

Elliot Washburn was master builder on following:
HELEN THOMAS 4 m. Jan. 2, 1904
MARGARET THOMAS 4 m. Sept. 10, 1904
MARY BRADFORD PIERCE 3 m. Dec. 24, 1904; built in 3 months, 14 days from laying keel to launching; 10 to 12 frames a day.
STILLMAN F. KELLEY 3 m. Aug. 17, 1905

At Boothbay Harbor (Elliot Washburn, master builder):
BRADFORD E. JONES 4 m. May 28, 1919
MARY BRADFORD PIERCE 4 m. Sept. 1919
JAMES W. HOWARD 4 m. July 5, 1920
JOSIAH B. CHASE 4 m. Jan. 8, 1921

Gunboat KENNEBEC built during the Civil War in the Hilt shipyard which was later the Cushing shipyard where Dunn & Elliot built. Rich Dunn gave the latter information.

The drawings for the sail made by G. K. Washburn are in the desk at 6 Elliot St, Master builder Ira Vinal made the moulds. Draftsmen who made models were :man in Damariscotta (Giben), Pascal in Rockport.

Ira Vinal would go to Virginia. Moulders were best men in crew. They fit patterns to the tree. Men who cut or "got out" the frame as marked by moulder were the broad axe men. Often colored men would fell the trees, cut off branches, doing the rough work. It used to take abbut 1000 or 1500 feet of pine boards to make the moulds at home. The moulds were made in a large room; the last of daddys were done in the present sail loft. Wheever got out the moulds would mark the pine boards (set of moulds would fill hay rack full).

Planker steamed so hot men used to put caps on shoulders to keep from getting burned.

Difficult to get sheer - Ira Vinal.

Two gal. spikes to each deck beam- bunged in. 3 or 4 men laying deck.

Workshop on ship in forward house. Pitch stove belonged to caulkers.

Elliot Washburn was son of George Washburn (not in Washburn Bros.) and cousin of Beth. His widow is librarian at Old Orchard Library.

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THE SHIPBUILDERS OF THOMASTON -- V
WASHBURN BROTHERS

The Washburn line in Thomaston begins with Kimball Washburn, whose son, George K. Washburn, married Abigail K. Dunn. Abigail must have been of the sailmaking Dunns who later founded Dunn & Elliot; at any rate George K. Washburn was a sailmaker, carrying on a business established in 1836. He also owned small shares -- a 16th or 32d -- in many of the vessels he made sails for. In 1883 the sail loft was taken over by his third son, Charles H. Washburn, who was born about 1848.

Meanwhile the retirement of Samuel Watts left an idle shipyard in Thomaston, and accordingly in 1886 the firm of Washburn Brothers & Co. was established. The partners were Frank A., Charles H., Edwin P., and William G. Washburn and James Overlock, a lumber dealer. As was almost invariably the case in the smaller Maine shipbuilding centers, a general store, where the ship carpenters could get credit, was operated in connection with the shipyard. In fact, it appears likely that a great deal of the capital required to finance the building of Maine ships, from keel-laying to launching, was unknowingly supplied by the wholesalers of New England. The shipyard workers, though generally paid in cash, spent most of their wages at the company store, and the line of credit extended by the wholesalers to the store helped carry the vessel until she was completed and the part owners paid in their full shares.

Newell E. Vinal was master builder for the Washburn firm when it commenced operations in the former Watts yard, and the first hull, the schooner MATTIE E. EATON, was completed early in 1887. The firm owned 1/32 of her, as did Vinal; C.H. and E.P. Washburn individually each owned 7/64, and the rest was widely distributed. The following is a list of schooners built by Washburn Brothers, with gross tonnages:

1887	3m.Sch MATTIE E. EATON	620
1888	4m.Sch JOHN K. SOUTHER	993
1889	4m.Sch MABEL JORDAN	993
1890	4m.Sch CHARLES L. DAVENPORT	1032
1890	4m.Sch HENRY J. SMITH	1108
1890	3m.Sch CARRIE T. BALANO	630
1891	3m.Sch MARTHA T. THOMAS	789
1893	3m.Sch CORA H. HANSON	525
1895	4m.Sch HENRY LIPPITT	895
1896	4m.Sch R. W. HOPKINS	935
1898	4m.Sch JOHN C. HAYNES	1346
1899	4m.Sch MARY T. QUINBY	1172
1900	4m.Sch JOHN E. DEVLIN	1107
1900	3m.Sch MARY E. LERMOND*	314
1900	4m.Sch JOSEPH B. THOMAS	1564
1901	5m.Sch JAMES PIERCE	1664
1901	4m.Sch JOSEPH G. RAY	1253
1902	4m.Sch HARRY T. HAYWARD	1203
1903	5m.Sch WASHINGTON B. THOMAS*	2638
1903	4m.Sch HELEN THOMAS	1470
1904	4m.Sch MARGARET THOMAS	1427
1904	3m.Sch MARY BRADFORD PIERCE	410
1905	3m.Sch STILLMAN F. KELLEY	685

The JAMES PIERCE and WASHINGTON B. THOMAS were the first five-masters built at Thomaston, and the only other one ever produced there was Dunn & Elliot's EDNA HOYT in 1920.

After a few years of operations at Thomaston, with their fleet well on the way to becoming one of the largest coasting schooner fleets on the Atlantic, the Washburns also acquired the old marine railway at Herring Gut, down the river from Thomaston. This town, which was rechristened Port Clyde by the post office authorities, is more accessible from the sea than Thomaston and hence more suitable for conducting a ship repair business. New construction was undertaken here from time to time also, and the following small schooners are listed as built by the Washburn Marine Railway Co., or (after 1892) by the Port Clyde Marine Railway Co.

1890	2m.Sch. FRED B. BALANO	263
1892	3m.Sch JAMES A. SIMPSON	250
1893	3m.Sch EUGENE HALL	319
1894	3m.Sch J. W. BALANO	537

The SIMPSON and HALL were managed by James A. Simpson of Westfield, New York,

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and the other two were run by the Washburns, along with all the schooners they built at Thomaston. In 1892 Overlock dropped out of the partnership, and the firm was reorganized as Washburn Brothers.

Along with the vessels built for their own account, Washburn Brothers also ran a couple of second-hand schooners, notably the 296-ton two-master GEORGE H. MILLS, built at Port Jefferson, N.Y., in 1867, and the 306-ton three-master J.S.LAMPREY, Salem, 1872. In 1904, at the time their 25th vessel (probably MARGARET THOMAS) was being built, it was stated that the firm had produced 11 from the same model, and that the recent four-masters were costing $70,000.

Washburn Brothers suffered a fairly high loss rate -- three schooners, JOHN HAYNES, MARY LERMOND, and WASHINGTON THOMAS, were lost when brand-new -- and in 1907 their fleet had dwindled to only 13 vessels including J.S.LAMPREY and GEORGE MILLS. Several more losses and sales occurred in the next few years, and by 1911 the last survivors of the fleet were sold outright to Crowell & Thurlow of Boston.

VI -- ATLANTIC COAST COMPANY

Crowell & Thurlow continued to build up their schooner fleet, and also built a line of steamers. In World War I they went into the shipbuilding business, acquiring several yards Down East for building wooden schooners. One of these yards was at Thomaston, where the Atlantic Coast Company, Crowell & Thurlow's shipbuilding subsidiary, managed by Will Washburn and with Ira Vinal as master carpenter, built the following schooners for Crowell & Thurlow's management:

1917	4m.Sch JESSIE G. NOYES	1376
1918	4m.Sch AUGUSTA G. HILTON	1652
1918	4m.Sch IDA S. DOW	1411
1919	4m.Sch N. VIVIAN PIERCE	1511
1919	4m.Sch WM. H. HARRIMAN	1450
1920	4m.Sch ATLANTIC COAST	1643
1920	4m.Sch ELIZABETH FREEMAN	1635

The registered owner of these vessels was changed from the Atlantic Coast Co. to the New England Maritime Co. in 1925, but Crowell & Thurlow continued as managers. JESSIE NOYES was lost in 1927; as was E. FREEMAN, and ATLANTIC COAST in 1926. WM. H.HARRIMAN went out to the West Coast in 1928 and ended in Los Angeles Harbor in 1940. AUGUSTA HILTON was lost as a Brava packet in 1933; IDA DOW was hulked at Newport News, and N.V.PIERCE, as EDWARD L.STAN, became a breakwater at Astoria, Long.I.

THE SHIPBUILDERS OF COOS BAY

III. HANS R. REED

It is difficult to trace the activities of a shipbuilder who was inclined to move about in his business operations, compared with the more usual cases where a man or a firm settles down in one locality and becomes identified with the shipbuilding industry of that port. West Coast shipbuilders, however, tended to be a restless lot, and none more so than Hans Reed. Thanks, however, to some autobiographical notes that he contributed to the "Overland Monthly" in 1895, together with painstaking work by Victor West of North Bend, Oregon, which has been made available to us, we can present a fairly detailed picture of Reed's career.

He was born in Norway in 1840 and was educated in the shipwright's trade. Having passed his examinations he shipped out for San Francisco, where he landed in April 1860. He at once found work in the shipyard of a fellow Norseman, John G.North, where he worked on the BROTHER JONATHAN, REFORM, YOSEMITE, CAPITOL, GEORGE LEWIS, and EUPHEMIA -- river and coastwise passenger steamers that were built or rebuilt by North.

After seven years at this work, Reed moved to the Mare Island Navy Yard for a year or so, and then went with his brothers Olaf and Edward to Davenport Landing, on Monterey Bay near Santa Cruz, where they built the JENNIE THELIN.

Reed next went to Puget Sound, where at Port Madison he built the J.S.PHELPS, still in association with at least one of his brothers, and then went to Coos Bay where he got out the frame of a steamer, shipped it to San Francisco, and at a spot then part of Henry Owens' shipyard and now occupied by the Union plant of the Bethlehem Shipbuilding Company he put together the steamer EASTPORT for the Oregon Coal Co. Then he returned to Port Madison and built a steamer and a barkentine with his brother Olaf. His work up to 1875 can be summarized as follows:

1869	2m.Sch JENNIE THELIN	145
1870	2m.Sch J. S. PHELPS	101
1872	Stmr EASTPORT	483
1873	Stmr EMPIRE	732
1874	3m.Bkn S. M. STETSON	707

In 1874 Hans Reed came to Marshfield as master builder for E.B.Dean & Co., in a yard originally set up in 1868 by John Hamilton Howlett and Captain James McGee for John Pershbaker, along with a sawmill. Mill and yard were acquired by Dean three

Republic. He also was a man who would allow no rough handling of his crew, yet managed to manoeuvre his ship in masterly fashion and to keep her in apple-pie order.

Captain George Cummings of "Young America" and "Three Brothers."

Captain George Cummings was also considered at the top of his profession, but he was cast in a rougher mould than Babcock, Burgess or Limeburner, and he was not above having a rough and tumble with one of his own officers. There was a noted second mate of the *Three Brothers* called Welsh Lewis, who claimed that he had thrown Captain Cummings through the glass door of the ship's after cabin. Though Cummings vehemently denied this, Welsh was a noted wrestler and a typical bucko who was quite capable of giving his own captain a severe drubbing.

Captain Cummings, it is said, would never dip his flag to a British ship, because the *Alabama* flew British colours when she captured and destroyed his beautiful clipper ship, the *Winged Racer*, in November, 1863.

Gates of the "S. P. Hitchcock" and Banfield of the "St. James."

In the last days of the Down Easter there were two captains who were noted in every sailors' boarding-house in every sailor-town the wide world over for their good treatment of the men under them. These were Captain E. V. Gates and Captain Banfield. There was no scrimmaging on the maindeck aboard their ships, no belaying-pin soup on dark nights, no booting off the yards, no lurid curses or savage blasphemies, yet both the *S. P. Hitchcock* and the *St. James* not only made fine passages but earned good dividends, whilst boarding-house runners had to use the strongest dope to entice their men away.

Captain William J. Lermond.

Captain William J. Lermond, of the *Samuel Watts* and *Joseph B. Thomas*, was another much respected American ship-master, and no bucko methods or hazing were allowed aboard his ships.

Captain Lermond had a strong vein of humour, and he was wont to declare laughingly that his make-up formed the ideal mixture. His great-grandfather came to Maine from County Antrim, Ireland, ran wild in the woods and married an Indian girl, a Maine Pocahontas, without the aid of a parson. All the rest of his forebears, Captain Lermond averred, were real white; it was clearly evident from his appearance that he had quite a dash of Indian blood in his veins.

Captain Lermond was a superb seaman, and his spyglass bore testimony to his skill, for it was presented to him by the underwriters, when he saved the dismasted *Samuel Watts* in mid-Atlantic and brought her into New York under jury rig.

He was commander and part-owner of the *Joseph B. Thomas* from 1881 to 1908, and sailed her with great success.

The Tragedy of the "Washington B. Thomas."

At the beginning of the twentieth century the American coasting trade was carried on chiefly by fast, shapely, three and four-mast schooners. The late William F. Palmer, a New Englander of the old school and one of those shipping men who not only had a keen eye for a ship but a very keen business sense, is said to have been the first man to make a success of the four-masted fore-and-aft coaster. But when he followed up his nicely designed four-masters with clumsy, huge, box-shaped five-masters, the lack of sail area soon brought many of his vessels to grief. To show the tragic ends of these big unwieldy schooners I give a list of the Palmer fleet on page 31.

When the *Joseph B. Thomas* was sold to the Californian Shipping Co., Sam Watts built a four masted schooner for Captain Lermond. The old square-rig skipper made such a financial success of this fore-and-after, taking deals from St. John, N.B., to Bristol, and then coal up the Mediterranean, that it was decided to build him a bigger vessel, a five-master of great carrying capacity. This schooner was called the *Washington B. Thomas* in honour of the junior partner of the Boston firm.

Captain Lermond handed over the four-master to his chief officer, Ed. E. Drisko, took the new ship from the ways and superintended

her fit-out. Then he set off in ballast to the Virginia coal ports, where he loaded for Portland, Maine.

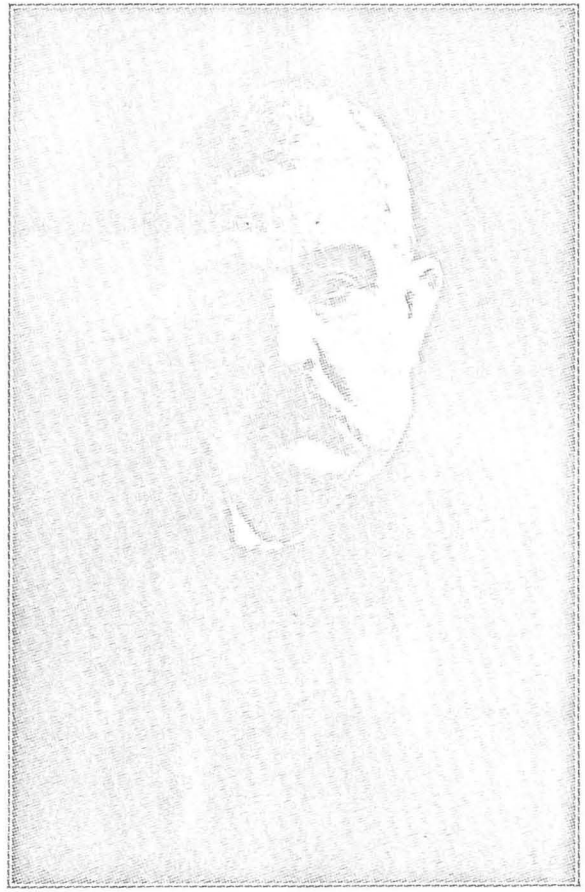
Winter had set in when Captain Lermond took his new schooner to sea with her first cargo, 4000 tons of coal. After leaving Newport News very heavy weather was experienced. At last it became so bad that Captain Lermond decided to take shelter under Stratton's Island, four miles off the Old Orchard.

THE PALMER FLEET.

Date Built	Name	Rig	Tons	Remarks
1900	*Maude Palmer* ..	4-mstr.	1745	Foundered at sea with all hands.
1900	*Marie Palmer* ..	,,	1904	Wrecked on Frying Pan Shoals, 1909.
1901	*Baker Palmer* ..	5-mstr.	2792	Foundered.
1901	*Rebecca Palmer* ..	,,	2556	Sold to Greeks, who scrapped her.
1902	*Prescott Palmer* ..	,,	2811	Foundered 1914.
1902	*Paul Palmer* ..	,,	2193	Burnt at Provincetown.
1903	*Dorothy Palmer* ..	,,	2872	Wrecked on Massachusetts coast; last survivor of fleet, had crew of only 9 men.
1903	*Elizabeth Palmer*	,,	3065	Sunk in collision with *Washingtonian* off Delaware coast.
1904	*Harwood Palmer*	,,	2885	Torpedoed off French coast, 1917.
1904	*Jane Palmer* ..	,,	3138	Abandoned off Bermuda, 1920.
1904	*Singleton Palmer*	,,	2859	Run down and sunk by steamer off the Delaware coast, 1921.
1905	*Davis Palmer* ..	,,	2965	Foundered off Boston harbour, 1909, crew of 9 drowned.
1907	*Fannie Palmer* ..	,,	2233	Foundered Christmas Eve, 1916.
1908	*Fuller Palmer* ..	,,	3060	Foundered, 1914.

At about 10.30 p.m. that night, when the easterly gale was at its height, the unwieldy schooner dragged on to the rocks and began to break up. The only chance for her crew was that the masts would stand, for all hands were obliged to take refuge in the rigging from the huge seas which were already washing the coal out of the vessel.

Captain Lermond was taking his young second wife to sea for the first time, and this terrible shipwreck was too much for her nerves; indeed, she was so terrified that he could not get her to leave the deck-house. Whilst he was begging the half-demented woman to get into the rigging, a big sea swept over the vessel, smashed the deck-house to smithereens, and took the captain and his wife



CAPT. JAMES F. MURPHY.

CAPT. WM. J. LERMOND AND HIS SON,
Master and Chief Officer of *Joseph B. Thomas.*

Lent by J. Randall, Esq.

(To face Page 32.

overboard. Both were washed ashore on Old Orchard beach; the captain was pulled out of the breakers when at his last gasp, but his wife was quite dead, her skull having been fractured when the deck-house was broken in.

The following morning the crew, some of whom were in a bad way, were rescued by the coastguard and life-saving apparatus.

Misfortune now piled its full weight upon the poor old captain; whilst he was slowly recovering from the terrible battering he had received in the surf, the news was broken to him that, by some oversight, his share in the schooner, which was practically every dollar he possessed, had not been covered by the insurance, and thus, at the age of 70, he was a ruined man. For a time his many friends tried to help him to eke out an existence by means of a few brokerage commissions and the like, but he was glad at last to find a refuge in the Sailors' Snug Harbour, that magnificent home for American seamen on the shores of New York harbour.

Here, in 1918, the grand old skipper breathed his last.

The Sail Carriers.

Amongst the most noted sail carriers amongst the Down East skippers were Dave Rivers of the *A. G. Ropes*, Phineas Pendleton of the *Henry B. Hyde*, Eben. Curtis of the *Tillie E. Starbuck*, Jim Murphy of the *Shenandoah*, R. J. Graham of the *Erskine M. Phelps*, J. Allen of the *Benjamin F. Packard*, and Dan Nichols of the *Wandering Jew*.

The sailing ship skipper would rather have a reputation for sail carrying than for any other seamanlike attribute, and I fear there may still be retired American shipmasters alive who will take me to task for omitting their names from this list. However, there were captains on the American Register who were notorious for other reasons than that of hanging on to their canvas.

Ed. Masters and His Tar Pot.

There was a Thomaston shipmaster named Ed. Masters, who was so great a believer in tar as a wood preservative that he spoilt the appearance of every ship he commanded. When he took over the handsome *Baring Brothers* from Captain Dick Thorndike

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TWO-DAY N. H. auction by Richard W. Withington in Concord, N. H., this Tues & Wed. See ad.

TWO FAST AUCTIONEERS & No Stopping at the BIG 3-day Danvers Galleries auction starting tomorrow. See ad.

KEEP your eye on this section for forthcoming announcement of a Tremendous antique sale of great importance—in Vermont.

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sofa-bed, walnut flat top desk, sewing machine, large ... GE automatic washer like new, oak bureau, chiffoniers, ta... room size and scatter rugs, large safe, kitchen utensils, canoe, ... bury half-dory, skiis, bird house, ladder, rotary lawnmower, table with motor, carpenter and cabinet tools, garden tools, etc., etc.

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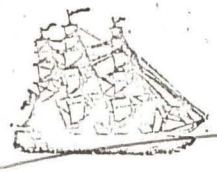

An Important, Unique Auction

HISTORICAL NAUTICAL MATERIAL

from Maine's Golden Decades of Sail

THE CONTENTS OF

Dunn & Elliots' Famous Sail Loft

ON THE ST. GEORGE RIVER, THOMASTON, MAINE

Three Blocks from Route 1 via Green Street

Saturday, September 11, 1965 at 10:00 A. M.

Preview Friday, September 10th, from 1:00 until 6:00 P.M.

From 1787 until 1920 the town of Thomaston, Maine, built hundreds of vessels. The Burgess & O'Brien Shipyard, Sail Loft and General Store were the nerve centers of this vast activity. In 1864 Dunn & Elliot took over the great work and carried it on until 1920, when the Edna Hoyt slid down the ways. Some of these Thomaston built vessels were sturdy draught horses, tilling the rivers and coastal waters of the eastern United States, others were gallant racers roaming the seven seas, bringing fame and fortune to their owners, their town and their nation. This auction offers valuable records, documents and objects having to do with the construction, operation and history of these vessels, as well as the men who built and sailed them.

A GREAT QUANTITY OF NAUTICAL PAPERS: About 100 General Store Ledgers dating from the 1830's, which include in their contents entries naming scores of famous sea captains, vessels, their provisioning lists, etc. Approx. 200 original sail plans for various type vessels built throughout the world. Complete 20th century business records of many Dunn & Elliot vessels—brigantines, schooners, ships, etc. These records are by no means dry reading, but contain here and there, data on which a great novel might be spun. Precise "share" records of various Dunn & Elliot vessels. The original notice to owners written in German long hand by the commander of U-Boat 151, announcing his sinking of the Hattie Dunn off the New Jersey coast in 1918—the first American vessel sunk in World War I. Two "Protests" re. the Ship Mary O'Brien made before the U.S. Consul in Liverpool, dated 1862 and 1864. Various charts, Ship Registries, navigation books, etc. (late 19th and early 20th century). Boxes of other papers, letters and records as yet not thoroughly examined. Also a copy of the Ulster Co. Gazette featuring an account of George Washington's funeral, and a rare scalloped parchment "Indenture", dated "London, 1644."

Six magnificent planked half hulls, 5 feet to 6 feet long. Four unusual rare sail makers' benches. Two quarter boards of the Reine Marie Stewart, and one from the Bickmore. Two brass ship logs, one in case. Three unique foreman's desks. Pair of ship's lanterns. Original ship yard bell which summoned the workers. A great quantity of antique ship wrights' hand tools of every sort. Blocks and pulleys in all sizes and woods. Heavy machinery includes 2 crabs, 2 splicing vises and 1 hand winch. Tremendous wheels and cart that conveyed huge spars to the ship yard. Quantities of chain and rope. Signal flags. A great mast. Considerable lumber (one plank 45 feet long). Original wooden bow and rib patterns used in constructing vessels.

Old store scales, tea box, measures, stove, spool cabinet, huge coffee grinder, press, showcases, etc.

The Sail Loft has been sold, and the new owner is awaiting termination of this auction to take complete possession. Full cooperation will be given, however, to those purchasing heavy machinery, spars, etc. This advertisement presents merely highlights of the auction. Time has not permitted a thorough survey of the goods to be offered, and it is highly probable that items as important, or even more so, than those listed herein, will be uncovered before the sale date. Every item in this sale belongs to the Elliot family, and has been consigned to the auctioneer without reserve to be sold at his discretion. Sealed bids and checks received from responsible persons unable to attend.

Ample hotel & motel accommodations nearby.

Seats. Caterer. Order of Dunn & Elliot Co.

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GEORGE W. DIETZ, AUCTIONEER & APPRAISER, THOMASTON, MAINE

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6th Annual

MILFORD, N.H. ANTIQUE Show & Sale

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(Thurs., Fri., Sat.)
at the
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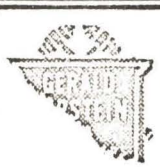

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1965

Birkkalagatan 28 b 40,
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15

Dear Mr. Kortum,

Thank you very much for your letter of March 8th with the beautiful picture of the PASSAT and the booklet about your museum!

Yes, I think your choice of photos are good indeed. Regarding the photo of the POMMERN in Svane-Sang there has, alas, been a mistake made in the captions. Picture 258 is from the collection of the late Jens Malling, whereas 259 was taken by me in the Ålands hav in 1934. 258 is not from the Ålands hav as given in the caption, but in the Danish Sound, the lighthouse of Drogden is seen upper right in the picture.

So I am sorry I cannot help you with this picture - I do not have a copy of it myself, other than the prints in Svane-Sang and Søens Verden, a nowadays extinct magazine.

But I can give you an advice how to get it. If you write to Denmark again - this time to Capt. Kaj Lund, c/o Handelsflådens Velfaerdsråd, Holbergsgade 14, København K, he certainly can help you. In an article about the POMMERN I once wrote for the above mentioned "Søens Verden", he produced just this same picture - so at least he knows where it can be got. So please, try and write to him.

I have a few other aerial photos of other ships, but they are by far not of the quality that you require.

When I last wrote to you I promised to let you know if I came across any notes about Finnish ships carrying cargoes of pitch-pine to Europe. Recently I happened to see - in old newspapers - four cases of such cargoes carried by Finnish ships, in 1900-01.

The comp. barque TJERIMAI, capt. Roos, arrived on Nov. 22nd, 1899 from Rotterdam to Pensacola in ballast. She was to take in a cargo of pitch-pine for Europe, probably Holland.

The iron barque MONTROSA, capt. J.Andersson, was chartered with a similar cargo from Pensacola to a port "between Le Havre and Hamburg" - freight being 120 sh. per standard. That was written in June 1900. but she was not ready to take her ca...

fore November or December.

The iron ship LOCH LINNHE ran aground at the coast of Fehmarn on Oct.5th 1900 with a cargo of pitch-pine from Florida to Kiel. She was refloated within a few days and the cargo was brought to its destination.

The fourth and last of those cargoes never reached port. It was carried by the wooden barque CUBA of Mariehamn, built at Richmond, Maine, in 1872. The CUBA was badly strained in heavy weather and eventually was abandoned by her crew in the North Atlantic. She had a cargo of pitch-pine from Biloxi, destined to Cardiff or Bristol. She had sailed on Dec.10th 1900 and was abandoned Jan.18th 1901, her crew taken on board the German steamer BARCELONA and landed at New York on Febr. 1st, 1901.

I hope these notes may be of some interest to you.

With regard to the SIGYN everything has come to a standstill at present, because of a total lack of money. She was partly rebuilt at Helsingfors last year - I must admit not quite to my liking, but at least she was rebuilt and towed back to Åbo. As her decks were partly opened when the money was spent, and consequently could not be relaid, she was roofed over and has been lying so since September last year in wait(ing) for better economic situation. Her new lower masts arrived in due order late in the fall, and were placed under roof. Fine spars they were, straight and beautiful, and will become the pride of the ship sometime in the future. A lot of new wire rigging has been made ready and served on board the SUOMEN JOUTSEN - our seamen's school - during the winter. That is all the news about her at present.

Sincerely Yours

Lars Grönstrand

Lars Grönstrand.

The Common Sense of Yacht Design

By L. FRANCIS HERRESHOFF

Chapter VI, Materials

(PART I)

ONE time, about 1840, Ralph Waldo Emerson was speaking to some young admirers in his library at Concord. He said, "Yes, at Harvard they teach all the branches of learning." Thoreau happened to be present for he was a frequent visitor in that household. Now Thoreau was a man with an uncommon amount of common sense. He spoke up from the corner of the room and said, "Yes indeed, they teach all of the branches of learning and none of the roots." It seems to be so today in the universities and colleges that teach naval architecture. The graduates are so crammed with higher mathematics, theory and engineering that they have had to skip over such seminal things as materials. How many of them, do you suppose, can tell one kind of oak from another, or even tell spruce from hemlock? Not many. How many do you suppose know the peculiarities of the useful woods and where and why they should be used in ship building? It may be safe to say—not any! So if I give wood some space in this chapter I hope you will excuse me. Sometimes I am glad that I went to an agricultural college; we certainly had some education about roots even if we never got to the branches. We learned some other practical things too. I can generally tell cow manure when I see it. Yes, and can generally distinguish horse manure when I hear it. Gentle Reader, I hope I am not shocking you too much, but you had better be prepared for something worse for I may speak of some things which have to do with the truth and will try to stick to more forensic words than "horse manure", but the truth and common sense are sometimes quite shocking in this democratic era. Nevertheless, what I am about to say will seem quite filled with platitude to those accustomed to wood work.

Wood. Wood happens to be my sweetheart and if I paint its picture in rosier hues than is always quite truthful you must put this down as the raving of a fond lover. Yes, I love the looks, the feel and the smell of wood. God had the trees grow almost all over the habitable parts of the world; He made them grow in infinite variety so that some were hard and some soft; some were small like the yew tree and boxtree, but were marvelous in texture; some were very large and of coarse grain so that in the two thousand or so varieties there could always be found one or another admirably suited to each purpose. The only thing God forgot to do was to make many men who understood the trees or had a feeling for them, and these, as the years went by, became fewer and fewer so that today many people and particularly the ladies think there are only two kinds of wood. One kind is stained red and called "mahogany"; the other kind is not stained red and not called "mahogany."

But the trees kept growing just the same in all the infinite varieties. Some were not only the largest living things in the world but by far the oldest, for the great Redwoods of California attained the height of 275 feet and diameter of fifteen feet, together with a calculated age of well over a thousand years. Perhaps they have the oldest family history of any contemporary thing, for geologists have recognized fossilized parts of the conifers (or cone bearing trees) way back in the Paleozoic era, many, many thousands of years before apelike man made his appearance. Glacial cycles came and went but the trees kept on growing. All the big reptiles and dinosaurs are gone now and man begins to dominate his brute associates, but without wood he never would have succeeded. He used it to make fires at the mouth of his cave at night which kept him safe from the wolves and bears; now he is baking pottery and smelting copper, all with wood. Someone has now invented the purlin and the rafter and man has left his cave forever. He has made himself a spear, a bow and a plow, all of wood; he has working for him the horse, the cow and the ass, which he keeps in wooden enclosures.

At first man only had stone tools and flint axes to work wood with, but between 3000 and 1000 B.C. he was using bronze tools and no doubt some of them were pretty good for it is possible to make bronze quite hard. After 1000 B.C. man had iron and steel tools and he has made great inroads into the forests. Just when primitive boat building started may never be known, but dugout boats, said by achaeologists to date back to Neolithic time, have been found. They were said to be of oak and of course were shaped out with the use of stone implements and fire. So, roughly speaking, man has been making boats and vessels of wood for twelve thousand years.

Patient Reader, you may very well say about here, "Well, what has all this got to do with yacht design?" My only object in all this talk is to impress upon your mind that man has been working in wood several thousand years and, judging from old wood carvings, furniture and ship construction, there were times in the past when he knew more about it than now. For instance, before the year 1800, ships were often built which lasted a hundred years, but those built today soon fall apart. As for the furniture made today—well, it has nothing about it which has to do with either art or science.

Now let's take a look at a tree and how it grows so we can understand the action of wood under different conditions. A tree has about the same area of root structure below ground that it has in area above ground. While the trunk and branches extend to quite an elevation, the roots usually only penetrate downward a few feet for much of our top soil is very shallow so that the roots of a tree form a sort of thin disk near the surface and generally reach out very much farther than the branches do, particularly in the directions where there is good feeding ground. The larger, or main, roots of a tree only act as connecting links and buttresses to support the trunk of the tree, but the small roots of the tree are the important functional working parts. The small roots are covered with root hairs which are extremely small and delicate, sometimes invisible. These root hairs are the feeders and drinkers for the whole tree. The root hairs are delicate tubes of very thin membrane; they excrete through their walls certain acid fluids which break down the chemical salts in the soil and turn them into available chemicals which are drawn through the walls of the root hairs by the process of osmosis. This physical process in short, is caused by a strong salt solution having an attraction for a weaker one, so the cell sap of the root hairs absorbs water and other chemicals through its thin walls which builds up a pressure called root pressure. This causes the sap to ascend through the trunk and branches to the leaves.

The leaves are the stomach and lungs of the tree and here the ascending saps, which are composed of water and a very weak solution of other chemicals, including sugar, are changed to a thicker starchy sap by the process of photosynthesis, which word is from the Greek and means light building. One of the results of this chemical process is the production of the green color common throughout the vegetable kingdom in upper sides of leaves. The lower sides of tree leaves in particular, are composed of pores called stomates which do the breathing for the tree and give off carbon dioxide and the surplus water in the root saps. It is said a large oak tree will transpire 150 gallons on a hot day. After the sap has been digested, or changed to a soluble form in the leaves, it is ready to be used for growth either in the leaf, the stem or the trunk; and that is what we are interested in.

Roughly speaking, the trunk of a tree is composed of four principal parts—the outer layer, or bark, is a corky substance which is water proof and a fine insulator. Next comes what the boat builder calls the sap wood and the botanist calls the cambium region, and this is a very interesting part for here the growth takes place. The saps descending from the leaves saturate this region with a solution favorable to growth in the summer time. The growing cells in the cambium region increase in number by cell division which is usually accomplished by a cell becoming bifurcated, or splitting in two, or what is called "cell budding", where the mother cell pushes out a small protuberance which later becomes separated. This increase in numbers of the cells of the cambium region makes the trunk spread all around so the bark has to stretch and becomes cracked. I cannot describe to you what cells look like or how they are arranged for under the microscope they show even more variation than the larger parts of the tree, but it is the peculiarities of their plan of growth that makes the different structures of woods so that a piece of

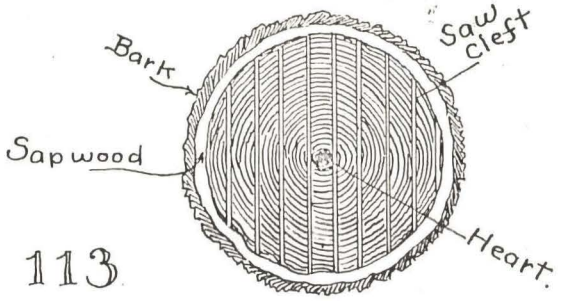


FIG 113

FIG 114.

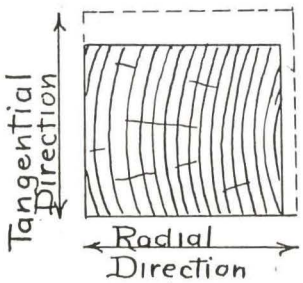


FIG 115.

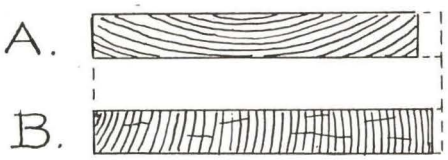
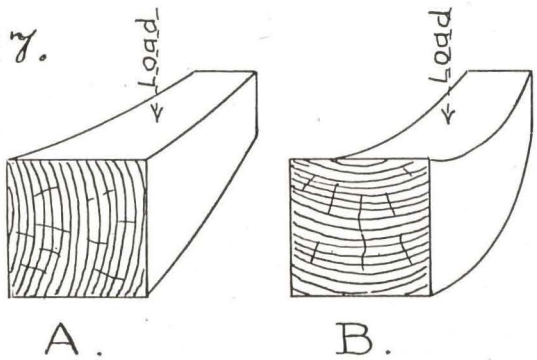


FIG 116.

FIG 117.



maple or basswood (linden) will look like a bunch of compressed cotton while some of the oaks resemble a fibro-vascular bundle like a hardened-up cornstock.

Some of the cells on the inner side of the cambium region each season begin to lignify or harden and turn to wood, and this seasonal change is what produces the annual rings or grain of the wood. In some woods, like boxwood which is very slow growing, the annual rings are only spaced about a hundredth of an inch or less, and the texture between the rings appears very uniform so that boxwood can be cut in all directions and is the favorite wood for small carvings. In some of the woods like chestnut or oak the rings are very pronounced and most of these woods can be easily split. However, some woods like elm, with a pronounced grain, resist splitting very much for the grains of the wood are interlaced.

In general it is this tubelike structure of wood, the cells themselves, the sap channels, the lenticels, which make wood one of the strongest known materials for its weight. You see these minute tubes separate the strong fibers and make up what is called a fibro-vascular bundle. On the compression side of a stick the cells hold the fibers in line so they cannot buckle; on the tension side the fibers act like stays. Yes, God and Mother Nature, working hand in hand for a hundred thousand years, have developed a marvelous structure. But like everything else, wood has its peculiarities. We have said before that wood shrinks and swells much more across the grain than with the grain so that a crooked-grained or gnarly piece always warps and twists some. Wood, as it is usually sawn up into planks, has the grain or annual rings running across the planks in different directions. See Fig. 113. Where these annual rings run across the plank it is said to be a rift grain plank; where the grain runs somewhat with the plank, it is said to be a slash grain plank (see Fig. 114), and these differences in direction of the grain in the plank have marked effect on the behavior of the plank for the hard texture in part of the annual ring seems to shrink and swell more in its tangential direction than its radial direction. See Fig. 115. Evidently when the cells of the wood are first formed in the cambium region they are arranged to expand tangentially, i.e., the girth of the tree increases three times as much as the diameter, so that a slash grain plank like Fig. 116A shrinks and swells more than a rift grain plank like B. However, wood is quite a little stiffer tangentially than radially so that a square stick like Fig. 117A will support a weight better than B, and for this reason a built-up spar like Fig. 118A is quite a little stiffer than the natural heart stick like B. But when you want to bend a stick far, or in the easiest way (as in bending frames) it is much the best to bend it slash grain, or like Fig. 117B. The different rate of shrinking radially and tangentially always makes a board warp or cup like Fig. 119 and you can easily remember this action by remembering that the grains try to straighten out as the plank dries out and ages.

I am now going to tell something about some of the peculiarities of the trees because several people have written in inquiring about them, and one man in particular has asked how to tell a white oak and how and when to fell it.

Our North American trees are generally divided into two categories: the botanist calls one class the coniferous trees (cone bearing), while the others are the deciduous trees (which have leaves that descend in the fall). Strange to say the lumberman classes these two divisions as soft woods (the conifers) and hard woods (the deciduous). However, the principal peculiarity of these two general classes is that the conifers are excurrent, or have a straight central trunk (see Fig. 120) while the deciduous trees are generally deliquescent or branching. Fig. 121. It is my belief that these peculiarities are the reasons why many of the best woods are not on the market today, for the lumberman does not want to bother with the limbs of a tree but prefers the straight central excurrent trunk so that about all you can get in the usual lumber yard today is miserable hemlock and some inferior firs.

The house carpenter no longer knows nor cares what varieties are best for sills, lintels or cornices, but flogs the whole house together with unseasoned woods which will show rot in two or three years while his great great grandfather builded houses that would last a hundred times longer.

The lumberman cannot bother with the crotches and crooks in the deliquescent tree; he saws them off and burns them at the edge of the forest so the breasthooks, quarter knees and aprons go up in smoke. But all the while the advertiser and the hawker is plying his trade in the market place for he loves to deceive the gullible and fool the simple. He raises himself up in the high places (supported by advertisement) and harangues the multitude, saying, "Look ye, how I have painted the lily and much improved on the works of God and Mother Nature, for I have taken the wood that was made to grow straight and by slicing it up into layers have so bent and twisted it that all manner of knees are to be had if you will buy of my glues, chemicals and bending traps." But the truth of the matter is that the real breasthooks, quarter knees, and anchor stocks have gone up in smoke at the edge of the forest.

But the trees kept on growing in all their infinite variety though there were but few who understood them. So it came to pass that various alchemists took the stand and as of old being motivated by some urge of exhibitionism, harangued the people, saying, "Look ye, at me now, for verily I am a performer of

miracles, for I have taken the wood whose nature it was to be hard and so altered it that it no longer has resistance. Yea, and not content with that miracle I furthermore have taken those woods which were soft and light and so bathed them with my chemicals that they have become quite hard and adamant. Now if those in back will wait their turn and not crowd up I will sell ye great quantites of these chemicals so that you too, can perform these miracles."

And there was much crowding and impatience for in this day the height of ambition is to make things that are quite spurious. But in the days of common sense (which we hope will return), this alchemist and hawker would have been pelted with eggs of uncertain vintage for then there were men who knew hard woods from soft ones, and under no circumstances would they have changed the natures of these woods for God had already made woods in two thousand degrees of hardness to choose from. The only things God lacked were a sales manager and a showroom.

You may very well say, "Well, where can we get all these woods that you speak of?" Now that's just the point, for the lumber yards no longer carry any great variety of woods. It seems people no longer like to make nice things but prefer veneered and stained trash shipped in by the carload, so if you ask for cherry, butternut, or even plain walnut, the lumberman will give you a blank look. If you should ask for pear wood (the finest of all for turning), he will as much as say you are crazy. Yes, everything today is subjected to the machine and big business. The corporations have hired designers and style makers to create styles (suited to their machines) which are flat surfaces finished off in a sander and coated with some quick drying Zapon. You may think the nice varieties of wood are getting scarce, but it is not so; the truth is that it no longer pays the lumberman to carry them.

Maybe now we should speak of some of the varieties of the woods suitable for boat building.

Spruce. The spruce family of trees is called *Picea* and there are comparatively few varieties native to North America, although several varieties have been imported from Europe and Asia for landscape effects, but these make rather poor timber, so we will only consider the Northern white spruce (*Picea glauca*) and Sitka spruce (*Picea sitchensis*). Both of these woods are about the strongest for their weight of any wood, and for that matter, the strongest known material for their weight and cost. These spruces weigh about twenty-five pounds to the cubic foot. The Eastern white spruce is the favorite and best material for small spars, racing oars and paddles. It has a fine grain and will take a nice finish. Sitka spruce is somewhat coarser grained but as it can be obtained in longer and clearer pieces is the best material for the larger spars. None of the spruces resist rotting particularly.

White Cedar. The whole cedar family is called *Thuja* and it includes specimens that vary greatly in weight and hardness, but the most useful one for boat building is the white cedar (*Thuja occidentalis*). This wood often is as light as twenty-one pounds per cubic foot in clear soft pieces. It is our best North American wood for the planking of small boats and is fine to work and stays in shape well; does not warp. The cedars all resist rot better than any other very light and soft wood. However, white cedar easily becomes water soaked so that it is not suitable for a buoy or float which will be left submerged, and this is a common mistake made with cedar. Soft pine or spruce will float higher than cedar after a few months overboard. But, for the planking of a small boat, where it is well painted or varnished, it stays quite light. No other wood, excepting Spanish cedar, equals it for light planking. Spanish cedar is harder and only weighs a little more, possibly twenty-four pounds, but it costs two or three times as much.

Port Orford Cedar (*Chamae cyparis*). This weighs about twenty-eight pounds to the cubic foot and is a clear straight grained wood and I have been using it in place of white pine for scrubbed decks when clear white pine was unobtainable.

All of the cedars are aromatic and have a natural oil in them which seems to resist rot, considering the softness of these woods. All things considered—price, weight, strength and ease of working—these cedars are among the best of all woods, and to stand at the bench knee deep in cedar shavings, planing up the planks for a canoe or rowboat, is one of the pleasantest things I know.

Butternut (*Juglans cinerea*). This is about the best North American wood for interiors on yachts; it is fine to work, stays in shape and does not shrink and swell much. It only weighs about twenty-five pounds per cubic foot. My father used butternut more than any other wood for the interiors of racing yachts. However, it is quite a soft wood and easily dented as you can guess from its very light weight. In appearance it is of a light brown slightly tinted with green and sometimes has a handsome grain. I have known it used for the seats and transoms of rowboats where lightness was required. Altogether it is a most desirable wood and resists rot better than some other woods of its weight.

Soft Pine. There is a great variety of woods sold on the market today as soft pine, and most of them are very poor and rot quickly. One of the worst of these is the so-called Ponderosa pine; it is not strong or light but still often rots out in two or three years. The good Eastern soft pine, called *Pinus strobus,* once formed vast forests in our northeastern states, in fact all the way from New Brunswick to Minnesota. It was once very cheap and many of our older New England houses were built of it inside and out. Some people have even said it was the finest timber tree in the world. This pine is now mostly used up and, besides man, the pine tree blister has been attacking it. However, at the present time there is quite a little of it to be had and it is called "hurricane pine" for millions of dollars worth of it was uprooted in the hurricane of '38. This has always been the favorite wood for New England cabinet makers and the finest wood obtainable for pattern making. This pine weighs about twenty-seven pounds to the cubic foot; it is the finest known wood for decking, particularly a scrubbed deck where it is important to have a wood that does not shrink much and is of light color that will not absorb the heat of the sun. It also makes most excellent planking on boats from twenty to forty feet long and I have known it used on many parts of a yacht and it was good in all cases. *Pinus strobus* will resist rot and last a long time.

Fir. There is as much difference in the lumber of the various fir trees as there is difference in pine, but one of the very good firs for lumber is the Douglas fir (*Pseudotsuga taxifolia*). I have used this wood for planking more than any other in the last ten years, but it is important to select fine grained planks and only use it rift grain. I have also used it for hollow spars as it is strong and only weighs about thirty-seven pounds per cubic foot when well dried. The best of this fir I believe comes from Washington or Oregon and it is a wood now often used for flooring in homes.

One of our native firs, the balsam fir (*Abies balsamea*), is one of the handsomest of the evergreens and suffers much for it. These trees are harvested by the millions each year for Christmas. Thousands of woodsmen pack hundreds of thousands of freight cars with these beautiful young straight trees at a few cents apiece and not one woodsman seems to stop and think what he is doing; but this barbarous German custom of murdering the beautiful children of the forest is about the direct opposite from the teachings of Him whose birthday was celebrated recently. How far better it would seem if each father took his child by the hand and walked into the woods (or to the park if he is unfortunately situated) and said, "There, my child, in all its glory stands a living tree; no man nor woman can decorate it more tastefully for each bow and limb is tapered to perfection, each tone of color blended in harmony. I hope, my child, I never hear of you chopping these young trees, lashing glass balls on them, or frapping them down with a lot of baggy wrinkle made of tinsel, only to make whoopie around a few days and then throw them out on the ash heap. My child, I would far rather that you venerate the tree, as the cow is venerated in the Indies, for the trees are man's best friends and without them you would still be a cave dweller."

Patient Reader, you may well say, "Well, what has all this got to do with yacht design?" But if we keep chopping the straight well balanced trees before they produce seedlings, the whole forest will soon go Democratic and it will be hard to find a heart stick straight enough for a boat hook let alone a spinnaker pole or a bowsprit, for Mendel's law of generation holds in the sylvan world as well as in the animal kingdom. Yes, soon we will have to do something to save the forests, for wars, Christmas and pulpwood are certainly raising havoc. Man seems to like wars and will start them on the slightest pretext, sometimes it is a difference of religion; one time it was a difference of opinion over the tax on tea. Both sides always lose and great inroads are made in the forests. Man also loves lies so each day several million newspapers are printed with ten or so pages, several lies to the page, and this has been going on for hundreds of years so if you multiply several millions by ten, by several lies, by several hundred you will have a rough idea how many lies have been printed on pulpwood and then you will know where the forests are going. Which is no lie!

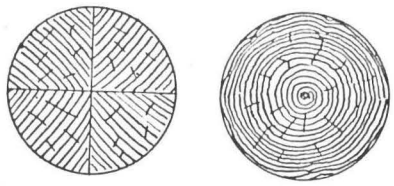


FIG 118. A. B.

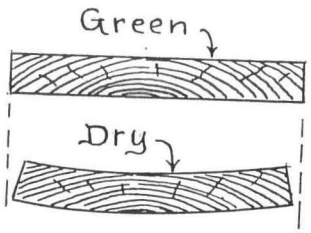


FIG 119.

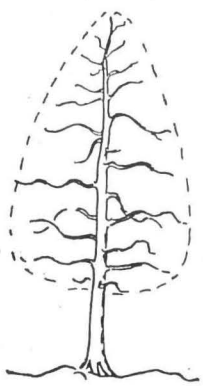


FIG 120.

FIG 121.

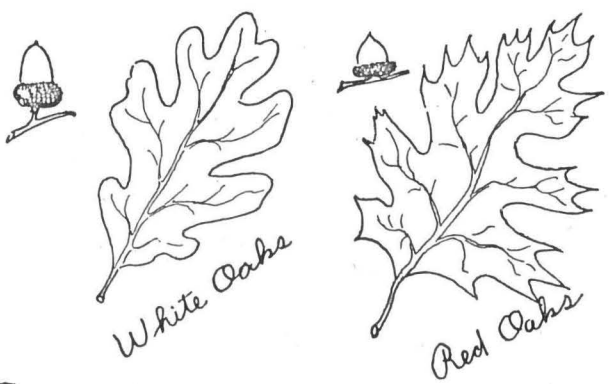


FIG 122.

Cypress. Cypress (*Taxodijm distichum*) is the best of all moderately light woods to resist rot. It weights about thirty-four pounds to the cubic foot. Cypress used to be carried by most of the lumber yards but now, since people do not care what houses are built of, it is harder to procure. I understand the cypress tree grows quite large and straight, but as it is usually in swamps the lumbering is quite expensive. Since my childhood the cost of cypress here in New England has increased two or threefold but no doubt in the South where it grows, it is more reasonable. Cypress makes excellent inner planking and is good for interior trim, bulkheads, etc., although it sometimes has a strong odor which is disagreeable to some people.

Ash. All of the ash trees are called *Fraxinus,* but the white ash that I am going to speak of is called *Fraxinus americana.* It grows quite large and has a massive straight trunk so it is one of our most valuable timber trees. Next to spruce it is the strongest wood for its weight we have. As for strength for size, it has slightly greater stiffness than oak. Good dry New England white ash from large trees only weighs a little over forty pounds per cubic foot although the so-called second growth ash is slightly heavier and stronger. Ash used to be the favorite wood for carriage building and was used some on early aeroplanes. I believe it makes the best deck beams of any wood. It is good for interior trim that will be exposed to hard wear and it is hard enough to resist denting. Ash is one of the harder woods to which glue adheres well. However, ash does not resist rot very well and it stains easily. Nevertheless it is one of my favorite woods.

Elm. The elm family is called *Ulmus,* and our native white elm, like the white ash, has the specie name of *Americana.* This wood, which weighs about thirty-seven pounds per cubic foot, is very similar in appearance to ash, in fact many cannot tell the two apart, but it is nowhere near as strong as ash in resisting bending, nor will it bend so far without breaking. Elm, though, will resist splitting amazingly. Elm makes good deck beams and is the best wood of all for sink and table tops for it grows whiter and whiter with scrubbing. American elm is the proper wood to use for all gratings and in England they use it for scrubbed deck work such as rail, caps, coamings, pin rails and buckets. Strange to say this elm is exported from Canada to England for use in frames of small boats and they like it very much. English elm (*Ulmus campestris*) is a quite different wood and much lighter than American elm. It makes most excellent planking for small craft. This tree in England grows to large diameter and has a handsome grain. We do not have anything just like it in this country or perhaps as good for some special uses. English elm works and planes much easier than American elm, in fact it is about as nice a working wood as our soft pine, but English elm is not on the market in this country I am sorry to say.

Yellow Pine. Southern long leaf yellow pine (*Pinus palustris*) that grows so well in Georgia is the best wood of all for the under water planking of medium sized yachts. It is also most excellent for the outer course or layer of double planking. This pine is real heavy, about forty to forty-five pounds per cubic foot; the best of it is so fat (as some lumbermen call it) or filled with rosin that it will not absorb much water and this perhaps is why it holds its shape and size so well. The dark grains in a good piece look almost like amber and that is the kind you should use. It does not take glue well but when set in shellac or white lead is the most all around satisfactory planking I know. It is not too expensive and resists rot remarkably well. It planes fairly well if the plane is sharpened right and well lubricated.

Hackmatack. This is a tree with many names for even in the same region some call it the hackmatack, some the larch tree, and others the tamarack so that, together with its Latin name *Larix laricina,* there is sometimes confusion. However, my guess is that there are less varieties or variations in the *Larix* family than most other trees although there is a European variety named *Larix decidua.* The hackmatack is the easiest of all trees to recognize in the forest for it is our only northern coniferous tree that is deciduous. In other words it is the only cone bearing, or needle leafed tree that sheds its leaves in the fall. The hackmatack, tamarack or larch, whichever you please, is a narrow spirelike tree with excurrent trunk and when its fresh light green leaves appear in the spring makes a beautiful sight in the forest. The lumberman always calls the wood hackmatack and although the trunk wood does not compare with spruce for strength and weight, it is sometimes sold for spruce but the spruce tree carries its full sail plan all winter while the larch tree reefs down for the blizzards. Hackmatack weighs about thirty-eight pounds to the cubic foot. It is the roots or buttress of this tree which interests the boat builder for from this part the famous hackmatack knees are made and they are the finest things on the market for stems, breasthooks, stern knees and all natural crooks on small craft. They finish off well and make a handsome appearance and are quite rot resisting. Personally I think the roots of all trees are of a superior texture to the trunk wood. Probably nature has made this part denser, stronger and more resistant to rot for very good reasons, but it is expensive to dig out roots and difficult to saw up the knees for often there are sand and small stones lodged in them. I believe the butt of a white oak makes the finest knees of all but they are hardly ever on the market.

Mahogany. The mahogany tree grows in many countries and apparently in about fifty or more varieties. Sometimes the trees are very large indeed and I have seen a balk (squared-up log) of mahogany fourteen feet square and about forty feet long come in to Boston Harbor on the deck of a steamer from Africa. If you don't believe this yarn you can ask any of the old timers in the Palmer, Parker Lumber Company of Boston. But the

lumberman does not like these large balks for the first few sawings are extremely difficult and expensive. The three principal mahoganies that probably will be on the future market are African mahogany and what I call Mexican mahogany, and Philippine mahogany so we will say a few words about each. African mahogany is said to be quite plentiful but the mahogany tree does not grow in groves or forests; instead they are often far apart so that the lumbering is very expensive. Generally a special clearing or road has to be made between each tree and the river, consequently many of the largest trees are not cut, for they are too expensive to handle. Some day possibly the caterpillar tractor may make some of these trees available.

On the whole African mahogany is a very nice wood; it varies in color and weight quite a lot and will average perhaps thirty-eight pounds per cubic foot, the wood from the upper part of the tree being lighter in weight and color and cheaper looking than that near the butt. The mahogany tree sometimes grows with two big limbs, or twin trunks, and where they join is the region where the fancy grain or crotch mahogany is cut. This is much sought after for making veneer. Sometimes it is called "flame," sometimes "sunburst mahogany" and other fancy names, but this crotch wood is not good for structural work for when it dries and shrinks it invariably cracks and checks, for the interlacing grains from the two trunks cross one another and shrink differently. However, if it is cut up into thin veneer before it has shrunk it will sometimes stay sound.

I cannot describe to you just what the different mahoganies look like and no other writer has before; you have to learn their looks from handling them, but African mahogany is apt to have a crookeder grain than the others and much of it interlaced so that it looks like a ribbon pattern with somewhat herringbone effect. Sometimes it is difficult to plane it.

Mexican Mahogany. Much of this mahogany used to be called Honduras but the true Honduras mahogany is darker and harder; however, Mexico extends way down to the Gulf of Honduras where Great Britain has a small colony, British Honduras, and this has been one of the great mahogany shipping centers of the past so that throughout the world the name "Honduras mahogany" is used. At any rate this region just south of the Tropic of Cancer grows fine mahogany.

Next to the eastward is the island of Cuba which grows most excellent mahogany. More to the eastward is Haiti where the famous Santo Domingo mahogany comes from and this is the finest, darkest and hardest of the mahoganies, but it has been so sought after for the last two hundred and fifty years that it is no longer procurable in large pieces. Yes, Santo Domingo mahogany is so hard and strong that delicate looking furniture can be made from it. It polishes so easily that the wood, as the plane or scraper leaves it, will glisten with only a little rubbing with oil.

I will speak a little of the use of mahogany in furniture for that is the principal thing that has made mahogany so well known. Mahogany became the fashionable wood for furniture in England soon after 1700 and by 1754 that mythical figure, Thomas Chippendale, had published his folio "The Gentleman and Cabinet Maker's Director." I say "mythical" figure for Chippendale in a comparatively short life, with the help of a few workmen and no power tools, made several pieces of furniture for each museum that was to exist two hundred years later and at least one piece for each wealthy English speaking family. Certainly his little shop on St. Martin's Lane in London must have been more crowded than the hold of the Mayflower (for she only brought over a few thousand pieces). But the strangest thing about Chippendale is that none of these pieces of furniture attributed to him have the slightest resemblance to the designs shown in the Gentleman's Director. Furthermore, it is plain to see that the drawings in the Director were made by one who did not understand wood work whereas the chair commonly known as Chippendale style is beautiful and scientific.

No doubt there were innumerable fine furniture makers and chair makers at this time in London who did not publish books. In the latter part of the 1700s the Adam Brothers (who were architects and interior decorators in London) made themselves famous to posterity by chance, for the last surviving brother made a collection of cabinet maker's drawings which have survived in the Sir John Soane collection. But strange to say, these drawings do not resemble the style usually spoken of as Adam but rather show things such as grates and mantelpieces in a complicated French style, mostly made of metal, stone or plaster.

Hepplewhite brought out his book, "Cabinet Maker's and Upholsterer's Guide," in 1788—or that is, his widow, Aleas, brought it out, for this was two years after Hepplewhite had died. The introduction to this book infers that the designs are after the prevailing styles in London so we can assume that they are not creations of Hepplewhite.

Sheraton, who seems to have been a drawing teacher around London, brought out his book, "The Cabinet Maker and Upholsterer's Drawing Book" in 1791. Apparently he had no cabinet shop. Patient Reader, I am only trying to bring out four points:

1. If one writes a book he will be credited with more than he ever did.
2. If the antiquarians and museum curators stopped trying to classify something that never existed, they would save themselves much confusion and bickering.
3. London cabinet makers made mahogany famous throughout the world by developing pleasing designs in furniture made from this wood in the late Georgian period.
4. Most people, and particularly the ladies, like mahogany because some well designed things have happened to be made from it.

Mahogany is not necessarily an expensive wood for there is much more of it than some other woods. Good straight grain mahogany suitable for planking a yacht costs just about one half as much as teak. However, fancy grain, hard, dark mahogany is expensive and should be for it is finished off well and takes an oil polish easier than most any other wood because it is free of pitches, saps and gums. Mexican mahogany is quite uniform in color. Above the butt it is straight grained and free from knots, rather open grain and characterized by little dark specks or lines in the wood. It is one of the nicest woods to work and strong for its weight which is sometimes only thirty-five pounds per cubic foot. It takes glue well and resists rot. Altogether it is about the finest wood for the planking of a high grade medium size yacht. I must note though that it is very common to find windbreaks (or compression breaks) in this wood; apparently these trees are sometimes severely bent in the hurricanes that are prevalent in the regions where they grow. These compression breaks can be seen easily by anyone used to looking at planed wood. Pieces that show these compression breaks should not be used where strength is desirable. However, most of this mahogany is so free of knots, shakes, sapwood and rot that there is little waste to it so that often the final cost of planking a yacht with this wood is less than with some much cheaper woods.

Philippine Mahogany. This wood seems to grow in great variety; some is quite hard and dark while some is soft, light and very cheap looking. Some people do not even class it as a mahogany. Almost all of it bleaches out or turns light gray with age while the other mahoganies nearly all turn dark and rich looking when exposed to the sun. Some of the Philippine is difficult to work for the grains are interlaced in such a way that it cannot be planed well in any direction. My impression is that it is not generally very strong for its weight and there is a great variation in the weight, but we might call it thirty-nine pounds per cubic foot. The harder Philippines do stand up well for planking and I should not hesitate to use these on any boat which was to be painted. However, it should not be used on a varnished job for no matter how it is stained it will look cheap or inferior. Philippine mahogany used to be (and probably will be again) cheap in price but I must admit I have not had much experience with it and cannot tell how it resists rot. The upper outside planking of Tioga shown in Fig. 25 is made of it, however.

All of the mahoganies are less expensive than the furniture dealers have succeeded in making the general public believe and it is quite amusing to me when I see more expensive woods which have been stained red. Beside my elbow as I write this is a nicely carved Chinese box made of sandalwood. Some vandal, maybe seventy-five or a hundred years ago, had stained it red. Perhaps it was the original Chinese maker who did it if he knew it was to be sold in England or America. Yes, sometimes you see nearly every kind of wood stained to imitate mahogany. Some maples and beeches can be made almost like it and after they have been varnished with a rather opaque varnish it takes really good eyesight to tell the difference. Maybe after all, the ladies are right and there *are* only two kinds of woods.

(*To be continued*)

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A Down East Merchant Fleet

BY RAYMOND H. TROTT

THE Houghtons of Bath, Maine, were among the Down East shipbuilders of the last century who made a notable contribution to United States maritime history. They built, owned and operated a fleet of forty-four vessels. With one exception, the Houghtons built all their own ships, and they built only for their own operation. In 1872 they purchased the ship *Harry Morse* which was built by J. Parker Morse and launched in July 1871. She registered 1365 tons and measured 198.2 x 37.5 x 23.8 feet. All the Houghton vessels were of wood, the earlier ones of native timber from nearby forests. Instead of being named for one of the more important owners, as was a common practice, most of the Houghton ships were named for places; the earlier ones for cities and towns, the later ones for countries ending in "ia." Their yard was located on the Kennebec River at the foot of South Street in Bath. There were two ways and dock space sufficient for two ships. In the yard also was a large shed for the storage of salt, an office, a blacksmith shop and several small buildings. Unfortunately, the original shipyard office was destroyed by a fire in 1898 and with it was lost a vast amount of accumulated data pertaining to the various ships. There are, however, oil paintings of twenty-two of the ships and eight half models owned by various members of the family. In 1917 a portion of the yard was sold to the adjoining Bath Iron Works and utilized for the construction of destroyers for the Navy. In 1932 the salt shed and several smaller buildings burned, and in 1942 the remainder of the yard was sold to the Bath Iron Works. It is now being used in the construction of naval vessels. The following brief sketch portrays nearly a century of shipbuilding and operating.

In 1802 Levi Houghton, aged nineteen years, son of Jonas and Lucy Houghton of Bolton, Massachusetts, landed in Bath, Maine, from the schooner *Sophronia* from Boston. He obtained employment with Jonathan Davis, a merchant and ship chandler. In 1808 his employer failed, and young Houghton bought the business. His first investment in a vessel was

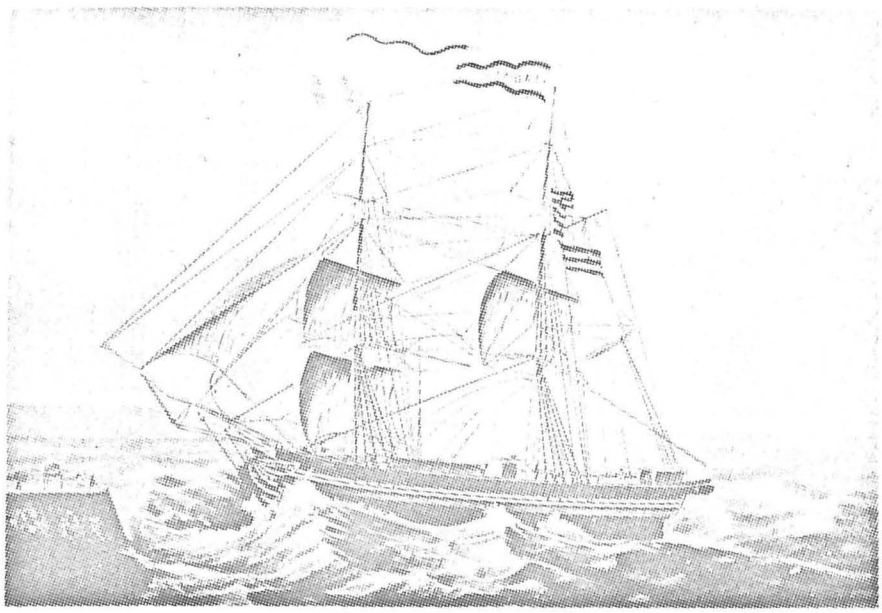
Am. Neptune Jan '44

in the brig *Betsy,* 207 tons, built in Bath in 1811. In 1819 he built the first of the Houghton vessels, the brig *Bolton* of 121 tons. The *Bolton* was the first of a fleet of an aggregate register tonnage of 40,000 tons, the last of which, the ship *Parthia,* was launched in 1891. From the date of his first vessel we find that Levi gave up his mercantile activities and devoted himself entirely to shipbuilding, except for an extensive and lucrative salt business. The importation of salt, largely for local shipbuilders to place between the planking and in the timbers of their ships, continued until the early nineteen hundreds.

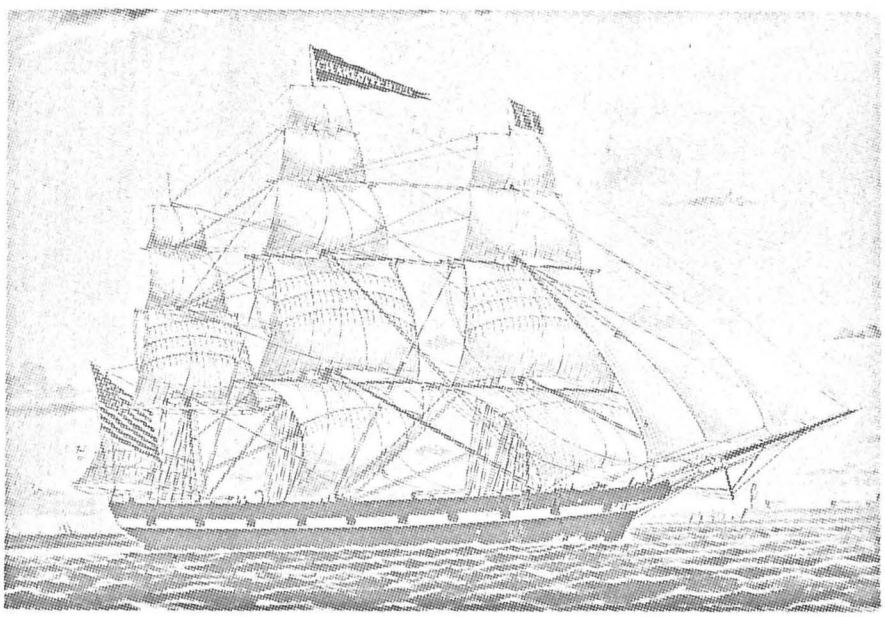
From the 121 tons of the brig *Bolton,* the fleet progressed in size and included four brigs, three barks and thirty-seven ships. It was not until the building of the *Shamrock* in 1853 that we find a vessel in excess of 1,000 tons, old measurement. She was of a tonnage of 1125. The *Arabia,* built in 1881, exceeded 2000 tons, being 2024 net, and the *Parthia,* the last, topped the fleet with 2370 net tons. The *Parthia* was 260 x 44 x 28 feet and carried 3500 tons of cargo.

These were not clipper ships and were not designed for speed. They were built as deep water cargo carriers. The only possible exception was the *Pocahontas* of 1088 tons, built in 1855, which was the only concession made by the Houghtons to the tendency of the fifties to sacrifice cargo carrying capacity for speed. There were few, if any, voyages of particular speed, although in 1895 the *Bohemia,* built in 1875, covered the distance from Manila to Delaware Breakwater in eighty-eight days, only four days longer than the record from the Philippines to an American Atlantic port made by the clipper ship *Wizard* in 1861. The *Bohemia* registered 1633 tons gross. In 1927 this ship was rescued from the Alaska fishing fleet and was used in a moving picture *The Yankee Clipper* and other pictures—a staunch vessel after fifty years of service. In 1931 she was 'torpedoed' and destroyed in a picture depicting submarine warfare. During her career she had met with a number of mishaps. In 1880 she was damaged by a typhoon while in ballast from Japan to San Francisco, losing the main topmast head, her three topgallant-masts and nearly a complete set of sails. In January 1891 she was severely damaged two days out of Liverpool bound for San Francisco and forced to put in to Waterford. In 1895 she was forced to put in to Rio de Janeiro, having been struck by a hurricane. She made twelve passages from Atlantic ports to San Francisco; one from Antwerp to Yokohama, Kobe and San Francisco; one from Cardiff to Rio de Janeiro, British Columbia and San Francisco; and one from New York to Rio de Janeiro, Newcastle, Australia, Manila and Philadelphia.

A number of the ships met untimely ends. The *Hanover,* built in 1838,

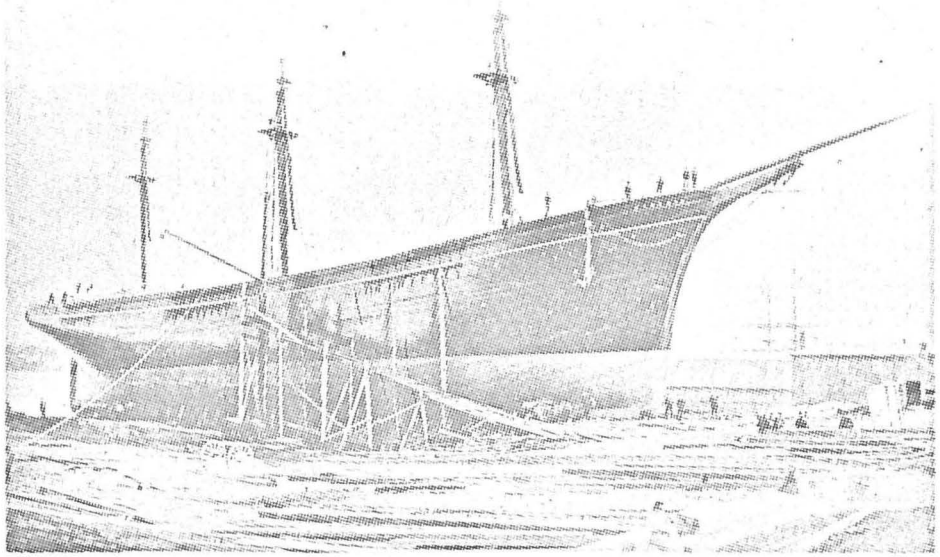


Brig *Clarissa Ann*, built 1824

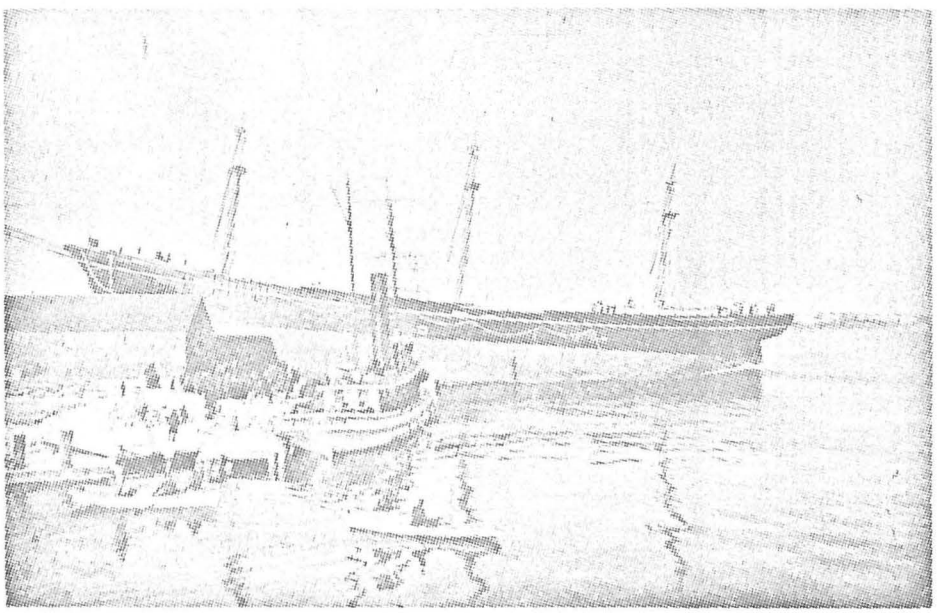


Ship *Charlotte Read*, built in 1845

PLATE 10



Ship *Armenia* just before launching, 1877



Launching of ship *Parthia*, 1891

was wrecked at the mouth of the Kennebec River in 1849. She had carried cotton to Europe and was returning to her home port with a cargo of salt. While trying to make the mouth of the river in a severe snowstorm in early November she missed stays and was thrown ashore. All on board of a crew of fifteen were lost. Her efforts to make the river were seen from the shore, and it is believed that many relatives of her crew witnessed her end. It is said that the only body identified was that of the captain who was dressed in his shore clothes in anticipation of an early landing. Harriet Beecher Stowe in her *Pearl of Orr's Island* relates the story of this wreck in the opening chapter. The ship *Persia* was lost in November 1870 on Frying Pan Shoal while carrying cotton from New Orleans to Liverpool. The ship *Arcadia,* while carrying coal from Leith, Scotland, to San Francisco during the year 1871, caught on fire and was run ashore on the coast of Brazil. The *Arabia,* 2024 tons net, was launched 2 December 1882. She was the first Houghton ship to have double topgallant-yards. She carried over 2800 tons of coal on three voyages from England to San Francisco, and on one voyage carried 3010 tons of refined sugar in bags to New York from San Francisco. This was said to be the first cargo of sugar shipped from San Francisco to New York. The *Arabia* made this run in the creditable time of ninety-six days. Altogether she made eleven round trips between North Atlantic ports and San Francisco. She left New York in March 1895 on her twelfth passage and was wrecked on Cape Horn. The following is the story of this wreck which appeared in the newspapers of that time, told by one of the survivors.

We left New York on the 24th day of last March bound for San Francisco with a cargo of general merchandise. She made a run of seventy-two days to Cape Horn. There we struck heavy gales and the ship for eight days headed south, making a steady southwest drift. On the night of May 17th we sighted rocks which the Captain made out to be the Diego Ramirez reefs, sixty miles southwest of Cape Horn. 'My God, we can't clear it,' he shouted. But we did. For a week we made good weather of it, and on the following Saturday the Captain got a glimpse of the sun and then made out that the ship was twelve miles off the Diego Ramirez Reef, pretty near the same spot we were in a week before. I had just gone below at eight bells when I heard that Mate bawl out, 'All hands on deck.' When I got up on deck I saw right ahead of me what I at first took to be a big iceberg a hundred feet high. It was the Diego Ramirez Reef covered with snow and in a few moments we went head on with a terrible crash. We cut the boats away and put off on the weather side. The Captain had his wife lowered down. It was pitch dark and snowing all the time, and the ship seemed to be sinking by the stern. During the night our boat ran across the Captain's dinghy and he sang out that his wife was freezing and we passed him some blankets. In the morning we found a landing place on a low part of the reef and went ashore. There we found a hut that had been built by sealers six years before,

and the Captain and his wife took possession of it. The ship did not seem to be breaking up awfully fast so some of us went back to her and brought off provisions and sails to serve as tents. We rigged up a signal of distress on the highest point of the island and two men were up there on the lookout every day. Eight days we stayed there. Finally on the eighth day the lookouts sighted a ship. Mate Leonard and four seamen manned a boat and put out to her. He reached her after rowing seven hours. It proved to be the English ship *Achilles* of Liverpool, bound for Hamburg. Mr. Leonard got back at seven o'clock in the evening and by two o'clock the next morning we were all safe aboard the ship. Twenty-eight days later we landed at Montevideo.

The *Geneva* was lost in a tidal wave at the Chincha Islands off the South American coast in May 1887 just as she had finished loading a cargo of guano and was ready to sail. The ship *Northampton,* with cotton from New Orleans to Liverpool, was lost in May 1883 on Molasses Shoal. The *Armenia,* together with two other ships, caught fire from a burning warehouse while loading wheat at Port Costa, California, and was destroyed on 25 August 1889. She had been entirely in the California trade, having made one voyage from Liverpool and nine from American ports. The *Parthia,* after the *Rappahannock* and *Henry B. Hyde,* was the largest three-masted wooden ship ever built in Maine. Her best run was from San Francisco to New York in ninety-six days, beating the *Servia,* also a Houghton ship, by one day. The *Parthia* was the last of the fleet and was burned in June 1895 while on a voyage from Liverpool to San Francisco with coal. Her crew took to the boats, one boat landing on Juan Fernandez, Robinson Crusoe's island, from which they were rescued by a Chilean naval vessel. The other boat reached Valparaiso.

Several of the other vessels met disaster after they have been sold to other owners. The *Austria,* launched in December 1869, registered 1300 tons gross. She made two voyages across the Atlantic with cotton and then was put into the California trade. She also made several voyages to the Far East and Australia. In 1886, A. M. Simpson & Brother of San Francisco purchased the Houghton interests. The *Austria* was later re-rigged as a bark. She was driven ashore and lost in January 1887 near Cape Flattery while bound from San Francisco to Tacoma in ballast. The *Samaria* was launched in September 1876 registered 1509 tons gross. She made three voyages from New York to Australia but was for the most part in the Cape Horn trade with San Francisco. In May 1896 she was sold to S. B. Peterson and used in the coastal trade. Ten months later, while on a voyage from Seattle south, she disappeared and is supposed to have foundered. The *Servia,* launched in December 1883, registered 1773 tons net. She made several voyages to the Orient and nine trips between Atlantic ports and

San Francisco at an average passage of 138 days. During seven passages to Europe with grain her average passage was of 125 days. A run from San Francisco to New York in ballast took her ninety-seven days, she having sailed four days after the *Parthia,* another Houghton ship, and arrived five days after her. She made a voyage from New York to Kobe in 153 days, thence nine days to Manila and 103 days from Manila to New York. She was sold at San Francisco and operated on the Pacific. On 6 November 1907, while loading canned salmon at Karluk, she was driven ashore in a heavy gale and lost.

In 1857 Levi Houghton died, and the business was carried on by his four sons, John, Silas, Henry and Warren, as Houghton Brothers. With the decline of shipping in the nineties and the advent of the steel ships, the Houghtons realized that the day of the wooden ship was nearing its end, and they ceased building. The salt business was carried on by the firm for a number of years through the era of the big wooden schooners although the Houghtons were not interested as owners in any schooners.

Henry Hall in his *Report on the Shipbuilding Industry of the United States* published in the eighth volume of the *Tenth Census of the United States,* 1880 (Washington, 1884), makes a number of interesting comments on the Houghtons and on shipbuilding in Bath. He says in his letter dated 30 November 1882 transmitting his report:

> The work of this investigation began in November 1880 in the City of Bath, Maine, at which place the greatest number and the largest and finest wooden vessels in this country are built.

In another part of his letter he acknowledges his indebtedness to L. W. Houghton for 'facts concerning cost of materials, cost of ships, and methods of building in former years.' Of Bath and its shipbuilding he says:

> At Bath, the principal shipubilding town of the United States, the business dates back to 1745, sloops and small schooners having been built at that early date for the coasting trade. This town enjoyed the advantages of a broad, deep river which seldom if ever froze over in winter, and of an abundant supply of the finest white oak and white pine timber, the banks of the river as well as the whole of the surrounding country being covered with dense forests of this valuable wood. The roads were bad, and traveling and trade were chiefly by water; but the town prospered more than any other on the coast. The first few experiments were successful, as the vessels made money, and the town went on building, increasing the size of its vessels and the field of their operations year by year. . . .
>
> Bath vessels are famous for their excellent model and their handsome appearance and are popular with captains on account of the pains which have been taken to fit up the cabins in style and comfort. . . .
>
> All the early Bath vessels were built of native oak and hard wood, with white pine houses, decks and masts. Oak and hard wood were put into the keels, elm

rarely, and sometimes black gum from the south. The stems and stern-posts, as also the planking, were always of oak; and this fashion, even after the introduction of pitch-pine, was retained for a while for the bow. The knees were formerly of oak. But the local timber of any value has been all cleared away, a century and a half of active shipbuilding and a large export trade in lumber having destroyed the old forests of this region.

The following table of costs in Bath was supplied to Hall's Report by Houghton Brothers:

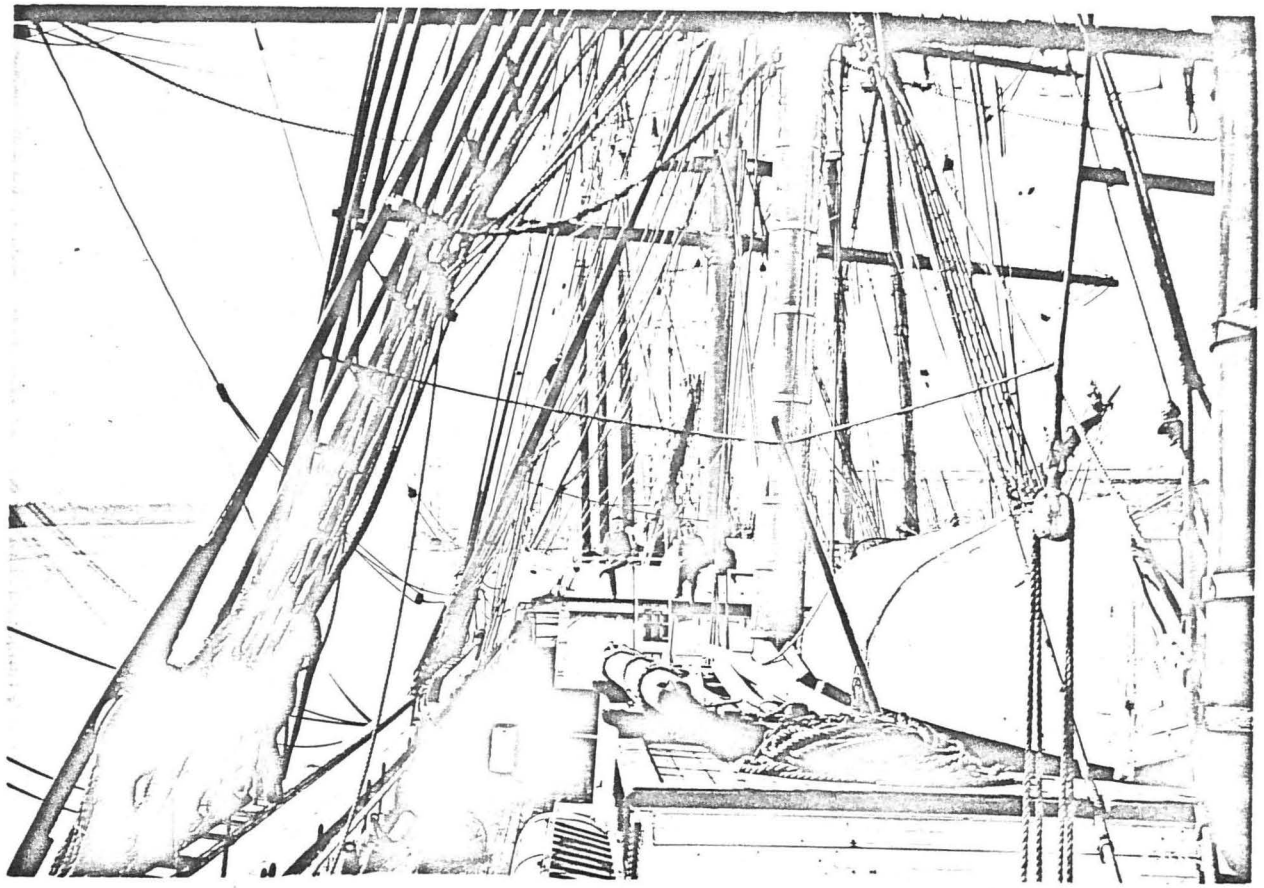
		1825	1835	1845	1855	1865	1880
White Oak, Maine	per 1000 ft.	21	25	27	27	33	35
White Oak, Southern	"				35	33	35
Pitch Pine	"			26	28	50	30
White Pine	"	10	24	26	30	40	35
Hardwood	"	15	15	21	22		
Iron bolts	per ton	85	80-90		45	90	60
Cost, per ton, to build		45	50	45	60	70	45

On another page Hall gives an account of the method of salting vessels that in all probability refers to the Houghton shipyard:

One firm has been known for making remarkably good vessels, which always sailed in the cotton trade to Liverpool, bringing back salt and manufactured goods. This firm bought the first southern pitch-pine to Bath to use for planking. The lower deck beams would not always be planked, and pine lumber was taken on in the southern ports and laid in loose, to aid in storing cargo. On returning to Bath after a round trip the masters left the dunnage lumber behind, and it was used in ceiling new vessels. Yellow pine came in such long pieces that its value was appreciated as soon as it was necessary to build large sized vessels. This firm now builds full-rigged ships only, of from 1,700 to 2,000 tons register, employing them in the California trade, and, to some extent, in the great ice business of the Kennebec to American ports. The durability of these vessels has been great, owing to care in the selection of materials and judicious salting. The ordinary mode of salting a ship is to fill the frame-spaces from the plank-sheer to the stops, put in at light-water mark, with mingled shavings and rock-salt, and sometimes with salt alone, from 50 to 75 tons of salt being required for a large vessel. This firm often bored auger holes in the top timbers, filling them with brine, which percolated through the heart of the timbers the whole length of the stick. Timbers thus treated were often as bright after 20 years' service as when first put in.

Hall gives a list of ships constructed by the Houghtons up to the date of his report, together with their measurements, as comprising one of the more important owner-constructed fleets. His list,[1] with the later ships added, follows:

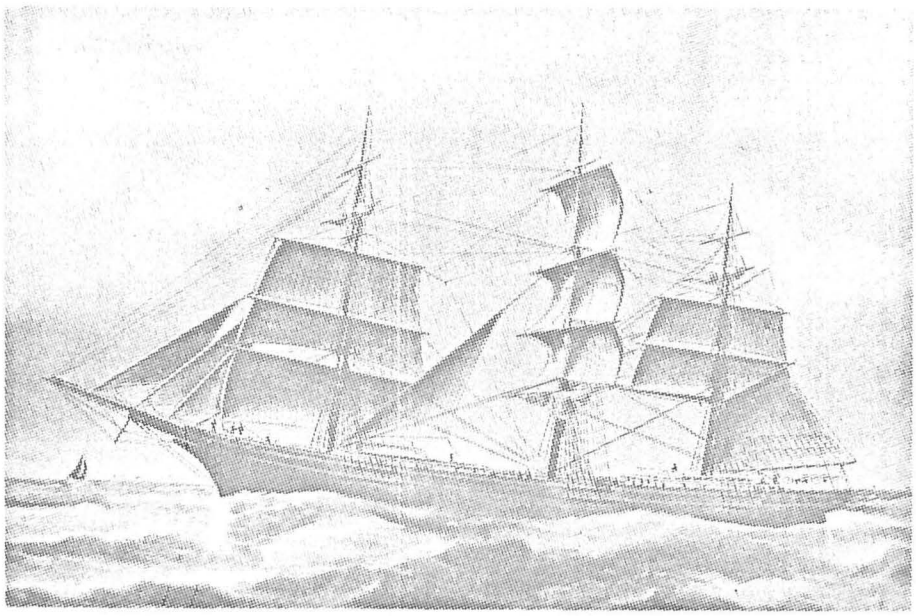
[1] According to Bath Custom House records, the brig *Sublime* (1823) was built by Jacob Robinson and the ship *Hanover* (1838) by J. Drummond. Since Hall includes them they have been retained in the table. Note that the systems of measuring tonnage and dimensions were changed in 1864; also that from 1823 to 1855 the actual depth of the vessel was not recorded, half the beam being set down instead.



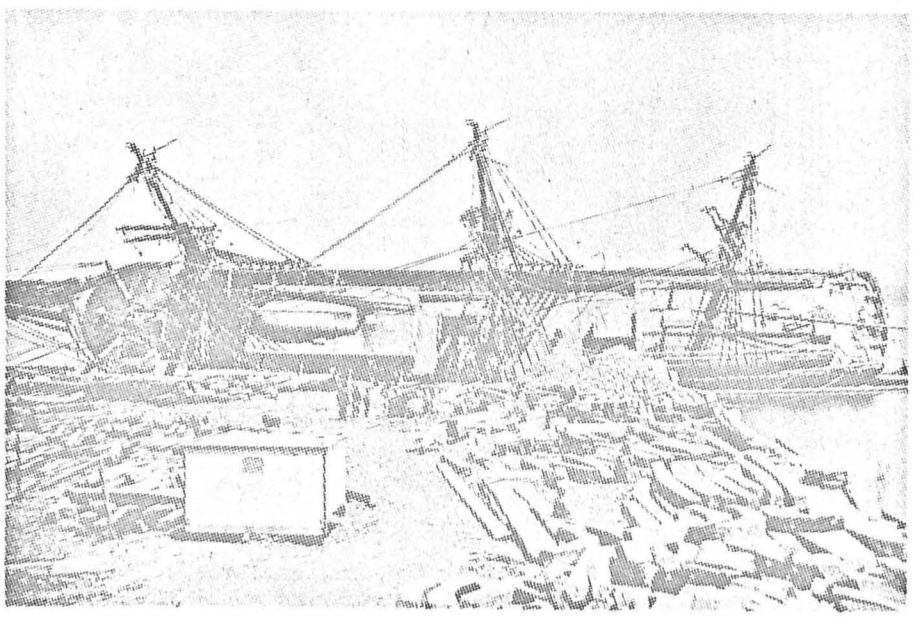
Deck view in 1885 of ship *Scotia*, built in 1865

PLATE 11

PLATE 12



Ship *Servia*, built in 1883



Ship *Europa* under repair at the Houghton Yard, June 1868

Built	Vessel	Rig	Dimensions: Length	Beam	Depth	Tonnage: Old	New, Gross
1819	*Bolton*	Brig	72′ 4″	22′ 9″	8′ 7½″	121	
1822	*Warren*	Brig	94′ 9″	23′ 5″	12′ 3½″	214	
1823	*Sublime*	Brig	93′ 6″	24′ 6″	12′ 3″	249	
1824	*Clarissa Ann*	Brig	97′ 3″	25′ 3″	12′ 7½″	276	
1828	*Caledonia*	Brig	102′	25′ 7½″	12′ 9⅞″	299	
1832	*Cordova*	Ship	106′ 1½″	26′ 5½″	13′ 2¾″	332	
1833	*Braganza*	Ship	111′ 5½″	26′ 6″	13′ 3″	353	
1834	*Missouri*	Ship	117′ 3″	27′ 5″	13′ 8½″	399	
1837	*Rochester*	Ship	131′ 2″	30′ 10″	15′ 5″	563	
1838	*Hanover*	Ship	135′	30′ 8″	15′ 4″	577	
1840	*Clinton*	Bark	112′ 8″	26′ 2″	13′ 1″	349	
1842	*Princeton*	Bark	105′	25′	12′ 6″	296	
1845	*Charlotte Reed*	Ship	128′ 6″	28′ 4″	14′ 2″	471	
1847	*Milan*	Ship	146′	32′ 5″	16′ 2½″	699	
1848	*Henry Warren*	Bark	113′ 3″	26′	13′	347	
1849	*Houghton*	Ship	156′ 6″	33′ 1″	16′ 6½″	787	
1850	*Clara Ann*	Ship	122′ 8½″	27′ 5½″	13′ 8¾″	421	
1851	*Pelican State*	Ship	153′ 4″	33′ 7″	16′ 9½″	849	
1852	*Kate Swanton*	Ship	135′ 6″	28′	14′	489	
1852	*Northampton*	Ship	174.9	35.9	23.7	982	1130
1853	*Shamrock*	Ship	186′ 6″	36′	18′	1125	1194
1854	*Baltic*	Ship	154′	33′	16′ 6″	769	
1855	*Potomac*	Ship	193′ 6″	36′ 5″	18′ 2½″	1198	
1856	*Pocohontas*	Ship	193′ 7″	36′ 4″	24′ 5″	1196	
1856	*Rochester*	Ship	156.8	31.5	21.5	644	824
1858	*Bolton*	Ship	180′ 6″	34′ 3″	17′	987	
1859	*Crescent City*	Ship	184.6	37.5	24.2	1015	1205
1859	*Europa*	Ship	177.4	36.9	24.2	949	1174
1860	*Persia*	Ship	183′	34′	23′ 5″	996	1248
1860	*Caledonia*	Ship	179.3	37.3	24.0	999	1179
1863	*Virginia*	Ship	177.0	35.5	23.6		1094
1865	*Scotia*	Ship	182.6	36.8	24.5		1171
1866	*China*	Ship	184.8	38.1	24.2		1173
1868	*Arcadia*	Ship	183.1	38.1	24.0		1234
1868	*Prussia*	Ship	184.2	36.6	23.9		1212
1870	*Austria*	Ship	198.9	39.0	23.9		1300
1871	*Columbia*	Ship	205.9	40.0	24.0		1471
1873	*Louisiana*	Ship	202.4	40.0	24.4		1436
1874	*Geneva*	Ship	216.4	39.9	24.6		1535
1875	*Bohemia*	Ship	221.7	40.2	25.5		1633
1876	*Samaria*	Ship	217.6	39.1	24.1		1509
1877	*Armenia*	Ship	223.3	40.4	26.1		1698
1882	*Arabia*	Ship	238.9	43.2	27.6		2081
1883	*Servia*	Ship	234.1	41.1	26.7		1866
1891	*Parthia*	Ship	260.3	44.4	28.0		2495

Following are the dates of the termination of the Houghton ownership of some of the vessels:

Hanover. Wrecked on coast of Maine. November 1849.
Milan. Captured by Confederates. 1861.
Northampton. Wrecked on Molasses Shoal. 1883.
Europa. Burned in Gulf of Mexico bound from New Orleans to Liverpool. 16 March 1873.
Persia. Wrecked on Frying Pan Shoal. November 1870.
Scotia. Out of register. 1887.
Arcadia. Burned and run ashore on coast of Brazil. 1871.
Prussia. Sold to Port Blakely Mill, Washington. 1883.
Austria. Sold to A. M. Simpson & Brother, San Francisco. 1886.
Columbia. Sold to A. Anderson, San Francisco. 1889.
Louisiana. Sold to San Francisco owners about 1895.
Geneva. Wrecked by tidal wave at Huanillos, Chile. 9 May 1877. See THE AMERICAN NEPTUNE, I (1941), 108-115.
Bohemia. Sold to Alaska Packers Association, San Francisco. 1896.
Samaria. Sold to S. B. Peterson, San Francisco. May 1896.
Armenia. Burned at dock at Port Costa, California. 25 August 1889.
Arabia. Wrecked on Diego Ramirez Reef near Cape Horn. May 1895.
Servia. Sold to Captain Henry Nelson, San Francisco. 1899.
Parthia. Burned and abandoned by crew in 41° S off Chilean coast. October 1895.
Harry Morse. Sold to G. E. Plummer, San Francisco. 1887.

Pacific Marine Review

October 1926

Romance of Hardwood

A Few Notes on Hardwood Supplies for Pacific Coast Boat Builders

By R. J. Alexander.

WHEN my friend, the editor of Pacific Marine Review, asked me to write a story on the the above subject, my mind immediately jumped back to boyhood days and visualized again a scene of fifty years ago—a short stocky master shipbuilder in a San Francisco shipyard, watching a shipjoiner shape up with a hand adze a natural oak knee and try to fit it to the camber of the deck beams and the curve of the frames. The master presently stepped across to the yard office and came back with an adze of his own, and in a few deft strokes had the knee perfectly fitted. "How do you do it?" said I. "Well, lad," said he, "to fit oak knees you must have oak in the blood." Pulling up his trouser leg and his woolen undies, he showed me a big blue lump on the inside of his right calf, which, said he, still enclosed a large oak splinter inserted fifty years before when, as a boy, on a winter morning, rough shaping from the square his first spar, he had slipped and straddled the stick the wrong way of the grain.

Now, I knew this old man to be the editor's grandfather. Why, then, ask me, a marine engineer, to tell the story of hardwood—why not write it himself. "No," said he. "We want perspective. Go and talk to White Brothers the hardwood merchants. Get the story of boat and ship hardwoods from the standpoint of the lumber industry."

At the yard of White Brothers, San Francisco's pioneer hardwood dealers, I found hardwoods of many varieties and in great quantities, and found also that the owners and managers of the establishment were full, literally to the lips, with the lure and the lore of hardwood romance. From C. H. White I learned that some hardwoods are very soft and many softwoods are quite hard, the technical distinction being that a hard wood comes from a broad-leaf tree and a soft wood from a needle leaf tree. Thus, much redwood and pine are hard in texture and grain and yet are classed as softwoods, while bass and poplar are very soft and still are decidedly hardwood.

To get trees of the broad leafed variety producing good quality logs, the Pacific Coast hardwood lumber merchant must go far afield and must therefore anticipate market demands and keep in stock large quantities of expensive merchandise. He must be very versatile in his knowledge and tastes. Some hardwood is sold by the pound, some by board measure. Veneers are priced according to the relative beauty of the grain markings and must be selected and sold to suit individual taste. There are thirty-nine different species in the stock list at White Brothers. These are stocked to a considerable extent in blocks and logs. Rare judgment must be used in the cutting of these logs for various purposes.

The hardwoods most frequently used in ship and boat building are ash, ironbark, lignum vitae, oak, and teak.. Laurel also is used extensively for dry-dock blocks.

Ash lumber, as used on the Pacific Coast, comes from the Central and Southern States—Indiana and Ohio, Tennessee, Kentucky, Arkansas. It is much used in steamer interiors, particularly in galleys and pantries. Ash is much used also for oars, boat hooks, ladders, refrigerating room doors, and side and stern light boxes.

Ironbark, a species of eucalyptus from Australia, is the hardest, toughest, heaviest, and longest lived of the gums. In ship work on the Pacific Coast it is generally specified for fenders, rudder stocks, and stern ports. Sheathing with ironbark is good practice on vessels designed for hard service in the Arctic.

Lignum vitae is a Central America and West Indian wood. It is of exceedingly close grain and one of the hardest and heaviest woods known to the trade. The perfectly smooth silky polish that it takes, combined with the fact that its natural oil content forms a very good lubricant in conjunction with water, makes this wood ideal for lining stern tubes and other underwater bearings. Lignum vitae is one of the woods sold by the pound. Incidentally it is rather interesting that this heaviest wood and balsa, the lightest wood known, grow naturally in the same locality.

Oak is the great shipbuilding timber. Ships of oak, propelled by wind, girdled the globe in the old days of wooden ships and iron men. White winged ships of oak chartered every sea, they "drew the world together" and "spread the race apart," they brought the first pilgrims across the Atlantic, they brought the Argonauts of Forty-Nine to the Gates of Gold. No modern floating palace of steel, however great her power, speed, or cruising radius, can find a sea whose waters have not already been parted by a keel of oak.

In modern wooden shipbuilding on the Pacific Coast, Douglas fir has taken the place of oak in the framing of ships, but neither it nor any other wood can ever take the place of oak in the long history of shipbuilding or in the hearts of ship lovers.

Oak, fortunately, is one of the most wide-spread and plentiful of the hardwood trees. The red and the white varieties are the ones principally used on the Pacific Coast, and the supply is largely from the Eastern States, with occasional large shipments from Japan. A special brand of oak for boat frames, known as Wybrock Indiana Bending Oak, is in great favor with boat builders.

Teak is an ideal shipbuilding timber, and a few of the finest, speediest, and toughest ships of the old days were built of this wood. Teak grows in Burmah, Siam, and Java. It has become too costly for ship framing, but is still largely used on the Pacific Coast for trim, decking, rails, deck houses, and joiner work by our boat and shipbuilders. The United States Navy uses it for racks in magazines and for armour backing on account of the oil in the wood, which has a very marked tendency to prevent rust or corrosion in adjacent metals.

Hardwoods such as Philippine mahogany, primavera, true mahogany, Jenisero, red cedar, Spanish cedar and many others, are specified for interior trim occasionally on fine yachts and passenger steamers.

The supplies of these hardwoods come from various out of the way places through correspondents whose integrity and ability have been established by long experience in mutual dealings. To get a certain specification of sizes in a certain grade of a certain species may require individual selection of a certain tree in the forest by a trusted agent. Logs from this tree may have to be carried many miles to stream, rail, or steamer on a slow-moving bullock cart. Months may elapse between the transmission of an order and the possible delivery of the goods. Hence it is imperative that the hardwood lumber merchant anticipate demand by keeping stock on hand. Hence large capital tied up and high overhead on hardwood. The writer well remembers a considerable delay caused in progress of construction on one of Uncle Sam's warships at the old Union Iron Works because a shipment of teak from Siam was held up. Some new breed of mosquito from "The Sludgy, Squdgy creek" had inoculated "the elephants apiling teak," with a new ailment and the pachyderms refused to work, so no teak could be shipped till they recovered.

The yard of White Brothers holds the largest and most varied stock of hardwoods west of Chicago. The firm was established in 1872 and has faithfully served the boat and shipbuilders of the Pacific Coast for fifty-four years. In building pleasure craft and even in workboat design the slight additional expense of hardwood trim will often add greatly to the selling value of the vessel and will aid greatly in economy maintenance.

January 1973

The Longevity of Colonial Ships

BY MARSHALL SMELSER and WILLIAM I. DAVISSON

ALEXANDER Hamilton wrote an official circular to the Collectors of Customs on 15 October 1789, asking for information on the maritime trade of the eleven states then in the union. The Circular asked seven questions about 'the mode of Navigating of the several States; and of Foreign Nations.' Among them was one about the building of ships. 'What is the quality of materials of which they are made; and their usual duration?' He asked that they write only of their own states, since each Collector would get the same inquiry.[1]

The question was not an easy one. Properly guarded and maintained a wooden ship could last forever. Wooden ships die by fire, by foundering after taking in water through hatches or seams, by collisions with other ships or with fixed hazards to navigation, or by catching the fungus infection called dry rot. Water does not itself harm wood, although alternate soaking and drying of a wooden structure requires systematic care to keep the parts from separating as they shrink and swell. Wood submerged in water will last indefinitely longer than wood exposed to air. A wooden vessel hermetically sealed in a container of distilled water would last as long as any artifact ever made. The fact that care will keep a vessel afloat is shown by some curiosities of ship registration. For example, the oldest vessel afloat in 1910 was a thirty-five-ton coaster in the Danish 'longshore trade named *Constance*, which had been built in 1723.[2]

Hamilton did not press the Collectors for replies, but in the following six months he received and preserved six, three from Boston, and one each from Philadelphia, Portsmouth, New Hampshire, and Alexandria, Virginia. Two of the Boston answers were unsigned; the other was from Benjamin Lincoln, the Boston Collector. The Portsmouth reply was from Joseph Whipple. From Philadelphia came a succinct answer by

[1] Treasury Department Circular to the Collectors of Customs, 15 October 1789, Harold C. Syrett, *et al.* (eds.), *The Papers of Alexander Hamilton* (15 vols., New York, 1961-), V, 446-47.

[2] Philip Watts, 'Ship,' *Encyclopaedia Britannica*, 11th ed.

William Bingham (and an earlier essay on the maritime trade of Pennsylvania by Tench Coxe, which was not quite to the point). John Fitzgerald, of Alexandria, wrote the other.[3]

According to these men, shipbuilding materials varied by sections. New England used oak for frames, timbers, and planking, pine for decks and masts, and spruce for lighter spars. The South used live oak and cedar, and Pennsylvania imported its wood from the South. In New England it was the custom to soak green wood in sea water for six to twelve months (which replaced the sap) and then to dry the wood and set to building. Elsewhere, as well as we can infer, they used the common technique of seasoning by drying in air storage; this is a process which might take years. The respondents could not be certain that this difference affected the longevity of the finished ships, but those who commented on the point believed the seawater treatment produced short-lived ships. It is now common knowledge that improperly seasoned wood used in boats and ships is much more liable to infection by dry rot than conventionally seasoned wood.

The answers which came from Benjamin Lincoln's office gave the usual life of a Massachusetts ship as twenty years. Fitzgerald, writing from Alexandria, estimated the life of a New England ship at ten years; Whipple of New Hampshire was near agreement (ten to twelve years), although Whipple added that New England vessels would last twenty to twenty-five years if made of well-seasoned wood. For the Middle States, Fitzgerald estimated a life span of fifteen years. Bingham said Pennsylvania ships lasted twelve years if of common oak, and up to thirty years if built of southern materials (live oak and cedar). For vessels built in the South, Fitzgerald claimed usual lives of twenty to thirty years. Fitzgerald had a theory of 'duration': 'American Vessells are lasting in proportion as they are built from East to West, for instance a Vessell built in Nova Scotia will be inferior to one built of Timber equally prepared any where to the Southward of it & so increases untill you get to the Missisippi.' He added that Philadelphia and New York ships of southern wood were exceptions to his rule.[4]

There was no way at the moment by which Hamilton could have confirmed the impressionistic reports of his Collectors and their friends. He was beginning a new maritime archive in a new republic. However, the old Empire had ample but improperly digested statistics on the same sub-

[3] Syrett, *Papers of AH*, V, 479-80, 491-92, 554-57, 569-70; VI, 19, 27-30.
[4] Ibid., V, 491.

ject. Allowing the assumption which we think true, that there was no revolutionary change in the methods of ship construction in the years 1715-1789, we can verify Hamilton's collection of impressions against a body of shipping records which have been refined from dross and put in useful form in this century.

The British shipping records, compiled by successive Naval Officers of the port of New York, list 2,962 entries and departures in the years 1715-1765. This is a minimum list, since only the records of peacetime years survived. Of these listings, all but 228 show the construction date of the ship and the place where it was built.[5] From 1701 to 1797 the number of vessels of British registry rose from just under four thousand to about thirteen thousand. Thus a sample of 2,962 entries is respectably large. It is also scientifically random, in that every oceangoing ship of the empire had an equal opportunity to fall into the category. The list merely mentions them as they put into New York and as they leave. It is not a history of individual ships, but a journal of sightings at a particular location, so to speak.

The average age of all vessels entered in New York port in the years 1715-1764 was 4.7 years, and only 9.4 percent were more than ten years old. If colonial-built ships lasted from ten to twenty-five years, all others must have been subject to a high infant mortality rate. Let us try to verify Hamilton's information.

Of 1,053 ships built in New England and entered in New York port from 1715 to 1764, only 124 were ten years old or older, or, roughly, one in nine. Conversely, 537 were three years old or younger, which is about half. There were 956 ships recorded as having been built in the Middle Colonies, if we include New York. Of these, 76 were ten years old or older—about one in twelve, and 403 were not more than three years old, a little less than half. Not many southern-built ships appeared as owned in New England, there being only ninety-five. Eight, or one in twelve, were ten years old, or more, and forty-four, or not quite half, were three years old or less.

Thus it is apparently true that the Middle and Southern Colonies built ships which lasted about the same length of time, but, in flat contradiction to Hamilton's correspondents, the Yankee-built ships lasted longer than those of the more southerly ports. And, on balance, the difference from section to section was slight.

[5] Colonial Office 5/1222-28, Public Record Office, London. The raw data were collected by Lawrence A. Harper, and edited and verified against the prime Naval Office Records (sometimes called 'The Shipping Records') in the Public Record Office, by William I. Davisson.

Joseph Whipple, of New Hampshire, had gratuitously added that ships built in the British Isles were the most durable. That was certainly true before American independence. In the years 1715-1764, 203 British-built ships had called at New York. Seventy-nine, practically a third, were ten years old or older, and fifty-four—about one in four—were three years old or younger. Unlike the scanty intersectional differences of the durability of ships built in British North America, the difference of longevity between those built in Britain and America decisively favors the construction methods of the British Isles. On the whole, British yards produced ships which lasted twice as long as those built in America.

Hamilton's inquiry and its results have been singled out as showing that he was much the best-informed federal officer, owing to his intelligent use of his network of customs officers.[6] In this case he acquired misinformation, unless American building practices had suddenly and radically changed in the twenty-five years after 1765, of which there is no evidence. The answers he received were of no particular value.

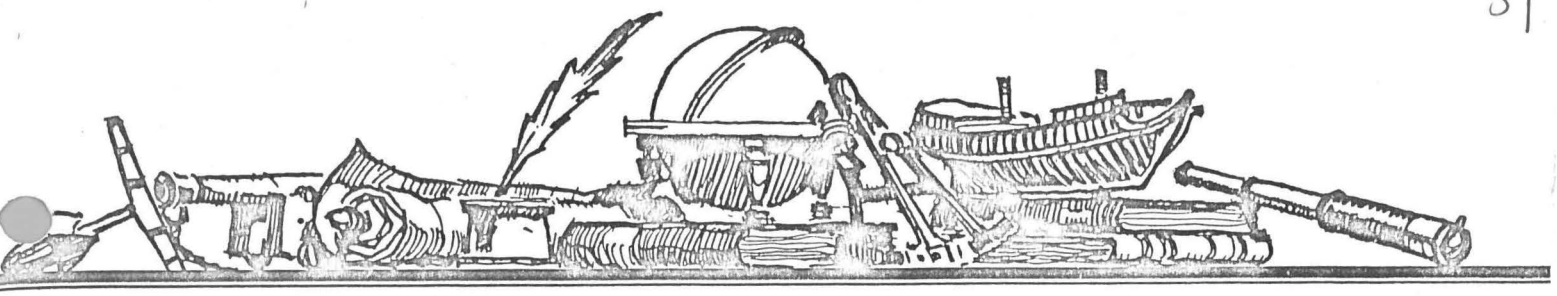
[6] Forrest McDonald, review, *The Papers of AH*, V-XIII, William & Mary *Quarterly*, 3rd series, XXVI (1969), 116.

Marshall Smelser is Professor of History and William I. Davisson is Professor of Economics in the University of Notre Dame.

Extract from a Journal Kept Aboard the Whaler *William Wirt* of Fairhaven, Massachusetts

6 July 1849: We spoke the ship *Christopher Mitchell* of New York—she came for the purpose of landing a female sailor that came from home in the ship. Her sex was discovered only the day before. During a passage of 7 months she had been regarded as a male, been aloft in a storm and calm and performed boat duty as well as any man. The cause—she was rejected by her parents after falling from virtue. She is but 17 years old and could have been reclaimed.

S. Lyle Hall



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MAINE SHIPBUILDING

by John Lyman

On the occasion of the 300th anniversary of shipbuilding in Maine, dating from the VIRGINIA of 1607, two Bath shipbuilders issued some remarks comparing the shipbuilding of 1847 with that of 1907. The "Nautical Gazette" of 8 August 1907 quoted William Rogers as follow:

"The first ship that I built was the ARLINGTON. It was of 600 tons, 137 ft. in length, 31 ft. beam, and about 21 ft. in depth. The launching occurred October 14, 1847. Between that time and 1902, when I retired from business, I built 102 vessels, mostly ships and schooners, the latter being in demand during the later years I was in business. The ARLINGTON, as was the case with all ships built 50 or 60 years ago, required about nine months for construction, and when she went into the water, she was a good specimen of the old-fashioned shipbuilder's art, embodying what were then new ideas. The frame was of oak and hackmatack from the forests of Maine and it had a hard bottom, composed of beech, birch and maple, which the growth of this State then provided. The lower futtocks were of hardwood and the upper of oak and hackmatack. The frame generally was what we called 'picked up', that is, we gathered woods in lumber operations in various parts of the State and used those which we knew were best adapted for ships. Sometimes we would have sections waiting for a long time before they were needed, held over until just the right places for them were found.

"We used for the planking, ceiling and beams Southern Pine, and usually the same for the lower masts, although a good deal depended on what we had on hand from the Maine forests. Whenever any straight, sound trunks were cut, which looked good for masts, we put them aside and kept them. Therefore, it frequently happened that we found sticks from the Maine forests just the right thing; but we had to count on the Southern growth for the lower masts generally.

"Our spikes came from the mills in Massachusetts and we bought most of our iron in Boston, although we had several good iron stores in Bath and excellent workers in the metal, also. It was principally Pennsylvania iron, but occasionally we got that which was rolled in Massachusetts mills, and, I suppose, came from abroad.

"Labor was cheap in those days, compared to the wages paid today. For skilled workmen the average rate per diem was $1.25, although the less experienced hands drew $1 and $1.10; and some of the more expert got as high as $1.50. The men usually worked from sunrise to sunset, and they kept at their undertaking very steadily. Today from $2 to $2.50 per day is paid, and the men work 8 hours in a day. Therefore I figure that the cost of labor at present is more than twice what it was 50 or 60 years ago, and I cannot see that the workmen have acquired any particular advantage in the change except in the fewer hours of actual work.

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r. Bernard Berenson, Librarian
Thomas Hornsby, Editor
Chronological Tables of Ship Building
ate of Mailing: Feb. 8, 1951

Willis L. Nye, Membership Chairman
Herbert F. Scott, Registrar
Guild Ship Model Registry

"We had none of the modern labor-saving devices in those days. Everything was done / hand, and when timbers were too heavy for a gang of men a yoke of oxen was used. e had no electric hoists or steam cranes; the men and oxen pulled, hauled and strug- led until they succeeded in getting things where they wanted them. Yet, we turned ıt ships that challenged the admiration of all nations.

"The Bath ships were known the world around and never was there any severe compe- ition with the output of the Maine shipbuilding yards. We had, in those times, the orests to draw on for material and the best ship workmen in the world. Today we can ompete with any section in turning out vessels, although we have to get our material rom all over the continent and much of it from the Pacific shore. Yet the Bath meth- ds and the Bath product are favorites among the men who want the best craft, and I elieve there is a most prosperous future for the building of wooden vessels here."

Samuel R. Percy of Percy & Small had some interesting comments that contrasted iliam Rogers' recollections with the methods then in use:

"Once the broad axe was the most important tool in a ship carpenter's outfit. It ıas used on nearly every piece of timber that went into a vessel. Now it is important, ɔf course, as the saw and auger always were, but machinery has taken the place of many ɔf these tools. Instead of slowly 'beating out' hackmatack knees, a tedious job, these ɔrooked sticks are placed on a 'tilting' saw table and cut into whatever twisting ɔurves the varying lines of a vessel may require -- and the work is completed in about ɔhe time that it used to take for a carpenter to get a knee 'dogged' on the blocks ɔeady for the shaping to begin.

"If a huge piece of timber 12 inches by 16 inches in size and 50 ft. long is to be tapered, or reduced in size to fit some particular place, an electrically-driven cir- ɔular saw, or a powerful revolving planer, completes the undertaking in three minutes, and often saves a valuable strip of lumber which in the old days would have been re- duced to chips.

"Power borers are now beginning to make the holes which once were the test of a strong man's arms, for holes from 4 to 8 feet in depth put through solid hard pine and oak meant the expenditure of no little power.

"Instead of the mixed hardwood which once went into the frames of the vessels, white oak is generally required for the modern schooners, and the parts are bound to- gether by a net work of strap iron which covers the outside of the frames with a metal basket work that was unknown three-score years ago.

"Slow-moving oxen have given place to teams of horses for hauling the heavy timbers about the shipyards and bringing them within reach of the big derricks which hoist them in place, and power driven tree-nail machines cut to an exact fit the long oak and locust 'trunnels' which pin the planking in place.

"Wire rigging has largely supplanted hemp. We put 15 tons of this material on the spars of one of the modern six-masters. (Continued on page 21.)

OLD TIME SHIPS, by John R. Stevens
A Review by Charles F. H. Menges

Mr. Stevens work, based on an extensive and intelligent study of contemporary sources, brings together a great deal of valuable information not previously accessible. In addition to having a comprehensive text which traces changes in design, construction and ornamentation through two and a half centuries of shipbuilding, the book is extremely well and cleverly illustrated. Included are four fine folding plates of an 80 gun ship from Steele's "Elements of Naval Architecture",a number of other drafts from Falconer, Crunze, Sutherland, Chapman, et al., some forty color type plates of admiralty and other models, fifty-two pages of principal dimensions and scantlings, and a large number of the author's own drawings.

Mr. Stevens is an excellent draftsman and his work, redrawn from models is particularly useful on the difficult finer points of construction and of decorative detail. This book cannot be recommended too highly. While it was evidently designed for model makers, and certainly is essential equipment for every serious model builder's shops, its material is equally valuable to any person interested in seventeeth, eighteenth and early nineteenth century shipbuilding. (An Account of the Construction and Embellishment of Old Time Ships, by John R. Stevens, 176 pages, 44 plates. Published by the Author, Toronto 12, Ontario, Canada.

BOOK REVIEWS - E. N. Rich

THE SAILING SHIP by Stanley Rogers. Harper Bros. Publishers, N. Y. - $7.50 (reduced price $5.00). At first glance (and price) this book seems a bit disappointing but when one investigates deeper into it and gets the writer's point of view it is well worth its investment (at $5.00). Mr. Rogers, as he states, "assumes the roles of naval architect, art critic, sailor and artist." For one who looks only for minute details in rigging and design he will at first be tempted to turn aside but when he investigates further he will be charmed with its material and with the methods of covering the material. The colored and black and white illustrations are well done. The subject of hull design, coloring and the art of the shipwright are presented in a method which is pleasing to the artist, historian and ship modeller as well.

THE SHAPE OF SHIPS by William McDowell, A.M.I.N.A. Published by Hutchinson & Co., Ltd., Hutchinson House, London, W.I. at 8 shillings, 6 pence. Here is a truly remarkable book both in material, finish and price. It contains 232 pages with 15 colored and numerous line drawings on the story of the development of ships from the earliest times to the present day. While this subject has been "done" many times there is much new information presented. It is a book that you will keep handy on your shelf and enjoy more each time you pick it up.

THE WONDERFUL STORY OF THE SEA by A. C. Hardy. B.Sc.M.I.A.F.R.G.S. 384 pages and over 300 illustrations, 12 shillings, 6 pence. Odhams Press Ltd., London. Very interesting book, While it deals with all epochs of ships it has a trend toward the later day ships but with much detail on old ships and their history, lighthouses, life saving services, Lloyds', Ports and docks and the sea in general. Lots of good information. One must try to excuse the Dragon ships of the Vikings, however, with steering rudder on the port side and well developed "jib" shown on P. 22!!!!

Maine Shipbuilding, John Lyman, continued from page 16.) An $8000 steam plant goes with one of these craft, furnishing power for pumps, electric lights, including two large searchlights, windlass, capstans and drum for handling the sails. Cabin and house are supplied with steam heat. A telephone system connects the captain with the engineer and steward. A power launch goes with each vessel. Where 100,000 feet of white pine would have been ample for such vessels as were turned out in Maine in the forties, now more than 1,000,000 feet of this lumber goes into a single craft, and the six-master we are now building (the EDWARD J. LAWRENCE) requires 1,100,000 feet. This vessel, measured from the tip of the jibboom to the tip of the spanker is 450 feet, a mighty contrast to the little VIRGINIA of 300 years ago."

THE SHIPBUILDERS OF BATH, ME.
II. PERCY & SMALL

One of the Bath yards specializing in fore-and-afters was that established in 1894 by Frank A. Small and Captain Samuel R. Percy. According to the analysis in LOG CHIPS, vol.1, p.28, their largest product, the six-master WYOMING, was the largest wooden sailing vessel ever built, and they turned out six other six-masters and 15 five-masters.

Frank Small was born in Bath on 17 April 1865, son of Capt.Joseph Small, a shipmaster long in the service of E.& A.Sewall, whose last command was the ship THOMAS M. REED of 1877. After high school, Frank entered the office of James B.Drake, a Bath shipbroker and insurance agent, where he learned the shipping business. Six years later he was associated in a similar capacity with Capt.John R.Kelley of Kelley, Spear & Co., leaving to form the firm of Percy & Small.

The senior partner, Captain Percy, was born 13 Dec.1856 at Parkers Head, son of Capt.Samuel R.Percy of that place who had died earlier that year at Santiago, Cuba, while in command of the bark BYRON. When young Samuel was 11, his mother married George M.Adams, a Bath shipbuilder, and he attended school at Bath until he was 16. Then he worked for six months in Treat & Lang's mill, followed by three years in the Adams & Hitchcock and Hagan & Thurlow shipyards. Then he went before the mast in the new ship M.P.GRACE.

He spent 7 years in the Cape Horn trade and in a coasting steamer out of San Francisco, becoming chief mate of the Freeport ship ENOS SOULE in 1879. In July 1882 he was appointed master of the Adams & Hitchcock schooner NORMANDY, leaving her in 1885 for the new three-master HENRY P.MASON which he sailed until 1894, when he retired from the sea. Adams & Hitchcock had quit shipbuilding in 1884 on the death of S.P. Hitchcock; when Adams died in 1893, management of their vessels was divided between E.C.Crosby and Capt.Percy, and Percy went into partnership with Frank Small.

The first vessel built by the firm in their yard to the south of the city of Bath was the schooner CHARLES P.NOTMAN, whose keel was laid in March 1894, and which was launched on 27 August. Captain Percy managed the shipyard, while Frank Small ran the operating end of the business in the former Adams & Hitchcock office uptown.

Here is the list of vessels built by Percy & Small:

		1894	
4m.Sch	CHARLES P. NOTMAN	1518	Percy & Small
		1895	
4m.Sch	WILLIAM H.CLIFFORD	1593	Percy & Sm.
		1896	
4m.Sch	S. P. BLACKBURN	1756	Percy & Sm.
		1898	
4m.Sch	ALICE E. CLARK	1621	J.S.Winslow
		1899	
5m.Sch	M. D. CRESSY	2114	Percy & Sm.
		1900	
5m.Sch	HELEN W. MARTIN	2265	Percy & Sm.
5m.Sch	WILLIAM C.CARNEGIE	2662	J.S.Winslow
6m.Sch	ELEANOR A. PERCY	3402	Percy & Sm.
		1901	
5m.Sch	OAKLEY C.CURTIS	2374	J.S.Winslow
5m.Sch	MARTHA P.SMALL	2178	Percy & Sm.
4m.Sch	CORDELIA E. HAYS	1281	J.S.Winslow
4m.Sch	MILES M.MERRY	1589	J.S.Winslow
		1902	
5m.Sch	CORA F. CRESSY	2499	Percy & Sm.
4m.Sch	MARGARET WARD	1074	J.S.Winslow
6m.Sch	ADDIE M. LAWRENCE	2807	J.S.Winslow
		1903	
4m.Sch	FLORENCE M. PENLEY	1154	Percy & Sm.
5m.Sch	ELIZABETH PALMER	3065	W.F.Palmer
		1904	
Sloop	UMBAJEJUS (Scow)	68	Shaw Lmb.Co.
5m.Sch	GRACE A. MARTIN	3129	Percy & Sm.
6m.Sch	RUTH E.MERRILL	3003	J.S.Winslow
		1905	
4m.Sch	EVELYN W.HINKLY	698	J.S.Winslow
4m.Sch	ROBERT P.MURPHY	697	Percy & Sm.
5m.Sch	LAVIS PALMER	2965	W.F.Palmer
		1906	
6m.Sch	ALICE M.LAWRENCE	3132	Percy & Sm.
		1907	
5m.Sch	FANNIE PALMER	2233	W.F.Palmer
5m.Sch	GOVERNOR BROOKS	2628	Percy & Sm.
		1908	
6m.Sch	EDWARD J.LAWRENCE	3350	J.S.Winslow
5m.Sch	FULLER PALMER	3060	W.F.Palmer
6m.Sch	EDWARD B.WINSLOW	3424	J.S.Winslow
		1909	
6m.Sch	WYOMING	3730	Percy & Sm.
		1912	
4m.Sch	DUSTIN G.CRESSY	862	Percy & Sm.
		1915	
4m.Sch	CARL F.CRESSY	898	Percy & Sm.
		1916	
4m.Sch	ESTHER MELBOURNE (ex CHARLES D.LOVELAND)	776	S.C.Loveland
4m.Sch	C.C.MENGEL JR.	844	Axim Tr.Co.
		1917	
4m.Sch	SAM C.MENGEL (aux)	915	Axim Tr.Co.
5m.Sch	DUNHAM WHEELER	1936	E.Cst.Tr.Co.
4m.Sch	ANNIE C.ROSS	791	Alex.Ross

see Addenda Page 89

	1918	
4m.Sch	LIEUT.SAM MENGEL	907 Mengel Box
5m.Sch	ST.JOHNS, N.F.	2056 (N.Y.)
	1919	
4m.Sch	MIRIAM LANDIS	904 (Bath)
5m.Sch	JOSEPH S. ZEMAN	1956 (N.Y.)
	1920	
4m.Sch	CECILIA COHEN	1102 (N.Y.)

The firm was incorporated as Percy & Small, Inc., about the time of World War I. It will be observed that up to 1916, except for the scow sloop UMBAJEJUS, built for the M.G.Shaw Lumber Co.of Bath, all the Percy & Small output had been for the account of J.S.Winslow & Co.of Portland, Me., the Palmer Fleet of Boston, or their own management. Their subsequent launchings were mostly for single-ship corporations, except for three schooners built for the Mengel interests of Pensacola, for the West African mahogany trade. One of these, the SAM.C.MENGEL, had an auxiliary steam engine, which was taken out at Pensacola in October 1917; the LIEUT.SAM MENGEL was rigged like a West Coaster with a squaresail yard and raffees on the foremast, and had a coppered bottom like a square-rigger.

Compared with the schooners built at Camden or Thomaston, the Percy & Small products appear to have been more strongly constructed, and to have lasted longer. The ANNIE C.ROSS, now the ELIZABETH SCOTT MOORE, is still afloat in Newtown Creek, Brooklyn, N.Y., and many of the others had useful careers as barges after their sailing days were over. Steel strapping was used extensively in the larger hulls; for example the ELEANOR A.PERCY had 290 ft of 1"x28" plate worked into her keelson and two long 3/4"x12" straps in her topsides, while the WYOMING, as described in "Marine Engineering" for Jan.1910 and in Underhill's recent "Deep-water Sail", was strapped diagonally every four feet in both directions.

Three of the four PALMERS were lost before World War I; the FANNIE PALMER foundered 500 mi east of Gibraltar in December 1916 with a cargo of coal from Newport News for Cartegena for the Spanish Government, the crew being picked up by the British steamer LADY PLYMOUTH.

Of the larger coal-carriers run by Percy & Small and J.S.Winslow, all that remained afloat in 1916 and 1917 were disposed of at advantageous prices for the transatlantic trade. The EDWARD B.WINSLOW and ADDIE M.LAWRENCE were lost on the French coast, while the CARL F.CRESSY and WILLIAM H.CLIFFORD were sunk by submarines in European waters. The survivors went back into the coal trade for a few years after the war, trading to Maine ports or to South America.

The last vessel owned by Percy & Small seems to have been the little three-master MARY E.OLYS, which was lost on Cape Porpoise on the first day of 1920. She had been built by the New England Co.at Bath in 1891. The Percy & Small shipyard site is now a cow-pasture, and the builder's model of the WYOMING in the Bath Public Library is the only tangible remembrance of the firm to be found in Bath.

Some spar dimensions of Percy & Small schooners may be useful for artists and modellers. The four-master S.P.BLACKBURN, which could carry 2800 tons, was 233.7 x 43.9 x 20.1 ft in registered dimensions. Her lower masts were 109 ft long including 11-ft mastheads; the fore 29" and the others 28" in diameter. The topmasts were 56 ft overall, the fore 19" and the rest 16". The spanker boom was 76', its gaff 47', and the other gaffs 45' in length.

The four-master CORDELIA E.HAYS, 202.5 x 40.3 x 18.7 ft, had 104' Oregon pine mast

The five-master M.D.CRESSY had made mast of hard pine, 114' long, the fore 29" and the others 28" diameter, with 54' topmasts. Her dimensions were 264.4 x 43.9 x 21.6.

The five-master WM.C.CARNEGIE, 289.2 x 46.3 x 22.4, had 118' x 30" Oregon pine lowers, with 56' topmasts, 21" on the fore and the rest 16". The bowsprit was 52' x 30", the jibboom 75' x 20", the staysail club 36', and the jib club 31'. The spanker boom and gaff were 86' x 20" and 56' x 14"; the others 48' x 15" and 45½' x 13". The booms and gaffs were spruce and the fore topmast and jibboom hard pine.

The HELEN W.MARTIN, 281.6 x 44.8 x 20.9, had 118' lowers and 54' topmasts, and the same size spars were used on the CORA F. CRESSY, 273 x 45.4 x 27.9. The rigging details of the latter were publis ed by G. B.Douglas in "The Ship Model Book," and have been widely reproduced.

The six-master ELEANOR A PERCY, 323.5 x 50 x 24.8, had 122' Oregon pine lowers, the fore 32" and five 31" dia. Topmasts were 54' x 21" on the fore and 16" on the rest. The jibboom was 70' x 21"; spanker boom 80' x 20"; and five sets of booms and gaffs 43' x 15" and 41' x 13".

It will be noted that the increased number of masts tended to hold gaffs and booms at a fairly constant size.

THE SHIPBUILDERS OF BATH, MAINE
V. WILLIAM ROGERS

We have dealt in this series so far with yards that specialized in contract work and which survived into the Twentieth Century. Another that fits into this category was the yard of William Rogers. The following account is based almost wholly on the Bath "Anvil" story in 1907 by Mr.Henry W.Owen Jr.

William Rogers was the son of William M. Rogers, who was born in Tamworth, N.H., in December 1788. He first kept a store in Ipswich and from there moved to Salisbury on Mount Desert Island, where he built a vessel named ONLY DAUGHTER. In 1819 he came to Bath and engaged in the lumbering business. His son, William Rogers, was born 16 Feb.1824, and was educated at Gorham Academy. After graduation he shipped before the mast on a voyage from Boston to New Orleans, Liverpool, and back to Boston, and, but for his father's opposition, he would have made the sea his career. Instead, at the age of 21, he joined in partnership with his father in the lumber business.

In 1847, William M. Rogers & Son acquired a shipyard site now located on the property of the Bath Iron Works and built their first vessel, the ship ARLINGTON. From that time on the building and operation of ships became the principal concern of the firm. Here is their list:

Year	Rig	Name(*owned by builder)	Tons
1847	Ship	ARLINGTON*	569
1848	Brig	SEGUIN*	198
1848	Sch	EAGLE*	134
1848	Ship	JULIET*	524
1849	Sch	H. NASON*	164
1851	Ship	MAY FLOWER*	720
1851	Ship	ELIZABETH*	470
1852	Ship	OTSEONTHE*	1137
1853	Ship	FAVORITE*	766
1854	Ship	NORTHERN EMPIRE	1499
1854	Ship	EMILY ST. PIERRE	883
1854	Ship	WM. M. ROGERS	979
1855	Ship	J. L. WARNER	895
1856	Ship	MONTMORENCI*	1085
1857	Bark	HELLESPONT*	454
1857	Ship	CONFIDENCE	649
1859	Ship	MISSOURI	674
1860	Bark	LUZON*	489
1860	Bark	S. W. PIKE*	541
1861	Bark	SOO LOO	629
1861	Sch	BONNIE ELOISE*	47
1862	Bark	THOMAS FLETCHER	639
1863	Sch	MARGARET*	163
1863	Bark	MERCURY	763
1864	Ship	FREEDOM	844
1864	Brig	OCEAN BELLE*	352
1865	Sch	MAY*	83
1865	Bark	WAPELLA*	728
1865	Bktn.	C. S. ROGERS	392
1867	Ship	BOMBAY*	955
1867	Bark	OMAHA	633
1868	Ship	HERCULES	1279
1869	Bark	UNA*	792
1873	3m.Sch	AJAX	319
1873	Bark	COLUSA	1188
1874	Bark	FRESNO	1244
1874	3m.Sch	BESSIE E. DICKINSON*	374
1874	Ship	HIGHLAND LIGHT	1314
1875	Ship	BONANZA	1356
1875	Sch	ANITA	211
1875	Ship	OREGON*	1430
1876	Bark	B. F. WATSON	992
1877	Ship	C. C. CHAPMAN*	1652
1877	3m.Sch	EDDIE HUCK	394
1877	Ship	DANIEL BARNES	1485
1878	Bark	ANTONIA SALA	534
1878	Ship	JAMES BAILEY*	1530
1878	Ship	LEVI C. WADE	1525
1879	Barge	JUNO	254
1879	Bark	HAVANA	649
1879	Bktn.	ARTHUR C. WADE	522
1880	Sch	FLORENCE L. SCHEPP	198
1880	Bktn.	PAYSON TUCKER	614
1880	3m.Sch	JOHN R. FELL	354
1880	Stmr	SEBENOA	89
1880	3m.Sch	ALFARETTA S. SNARE	252
1881	3m.Sch	MESSENGER	344
1881	Ship	DAKOTA*	1271
1881	Stmr	KANAWHA	536
1881	Bark	ROSE-INNES	835
1881	Ship	CHARMER	1881
1881	3m.Sch	BELLE O' NEILL	467
1882	3m.Sch	JUNE BRIGHT	346
1882	3m.Sch	SARAH D. FELL	581
1882	3m.Sch	E. H. WEAVER	686
1882	3m.Sch	M. V. B. CHASE	457
1882	3m.Sch	HARRY PRESCOTT	433
1882	Ship	ABNER COBURN*	1972
1883	3m.Sch	GEORGIE L. DRAKE	465
1883	Ship	GOVERNOR ROBIE*	1712
1883	3m.Sch	EMMA F. ANGELL	862
1883	3m.Sch	MARY L. ALLEN	329
1883	3m.Sch	DOUGLASS HOVEY	492
1883	Ship	KENNEBEC*	2126
1884	Bktn.	ARTHUR C. WADE (2d)	699
1884	Stmr.	WIWURNA	98
1884	3m.Sch	RELIEF	229
1885	3m.Sch	EDWARD C.ALLEN TRUE	824
1886	4m.Sch	BENJAMIN F. POOLE	1136
1889	4m.Sch	JACOB S. WINSLOW	910
1889	Bark	MATANZAS	1028
1890	4m.Sch	R. F. PETTIGREW	931
1890	3m.Sch	JESSE C. WOODHULL	602

* See Page 14, April, 1956

1890	Bktn.	KREMLIN	786
1891	4m.Sch	ELEAZER W. CLARK	934
1891	3m.Sch	JOHN B. COYLE	685
1891	4m.Sch	THREE MARYS	1151
1894	4m.Sch	CLARA E. RANDALL	950
1895	Barge	FOREST BELLE (4m.)	1333
1896	Barge	JERSEY BELLE (4m.)	1335
1898	Barge	KENTUCKY (4m.)	1575
1898	Barge	WEST VIRGINIA (4m.)	1564
1898	Barge	VIRGINIA (4m.)	1548
1899	Barge	NEW YORK (4m.)	1688
1900	4m.Sch	MARIE PALMER	1904
1900	4m.Sch	MAUDE PALMER	1745
1902	4m.Sch	CITY OF GEORGETOWN	599

We left out of her proper position in the above list the ship RICHARD P. BUCK, 1567 tons, built in 1882; even so, the list totals only 98 vessels. The CITY OF GEORGETOWN was stated to have been Rogers' 100th hull, so we have missed two somewhere.

The elder Rogers died on 3 Dec.1864, and William Rogers continued the business alone, becoming more and more a contract builder. About 1870 he acquired the former Reed yard at the South End of Bath, but after a couple of seasons there bought the old Trufant & Drummond yard, which after he retired in 1902 was incorporated into the Kelley-Spear shipyard to the south.

Mr. Rogers served in the Bath city council, in the Maine House of Representatives in 1876, 1877, and 1884, and in the Maine Senate in 1878 and 1879. Still hale and hearty at the age of 83, at the time of the celebration of the 300th anniversary of Maine shipbuilding in 1907 he prepared an interesting description of early Maine shipbuilding, which was published in the "Nautical Gazette" of 8 August 1907 and reprinted in the "Nautical Research Journal" of February 1951. It made an interesting contrast with a statement by Samuel R. Percy of Percy & Small, which described some of the methods then in use.

Mr. Rogers left Bath for a time in the period 1869-1872 to engage in some business venture in the West, but met with severe financial reverses and returned to his native city. The AJAX, which started him back on the road to prosperity, was built in 1873 in the yard of Deering & Donnell with Rogers supervising her construction for H. I. Huck of Indianola, Texas.

VI. DEERING & DONNELL

This firm was established in 1866 and dissolved 20 years later, both principals continuing as builders separately for many years more.

Gardiner G. Deering was born in 1833 in Edgecomb, Me., the son of a ship carpenter named David Deering. The younger Deering came to Bath at about 14 years of age and learned his father's trade in the yard of Henry & Rufus Hitchcock. Some years later, Henry Hitchcock's daughter Clara married a ship joiner named William T. Donnell, and in 1866 the firm of Deering & Donnell was formed to operate the former Hitchcock yard.

A native of Bath, born 20 Sept.1837, Donnell was the son of Benjamin Donnell, who was master joiner for Richard Morse & Sons, William Rogers, and Curtis, Cox & Arnold. The new firm specialized in fishing craft and small coasters. Here is their list:

1866	Sch	HATTIE J. HAMBLIN	32
1866	Sch	R. B. GANGLOFF	9
1867	Sch	LIZZIE D. SAUNDERS	43
1867	Sch	WILLIAM WALWORTH	44
1867	Sch	GLENWOOD	62
1868	Sch	SEA QUEEN	61
1868	Sch	JOSEPHINE	38
1869	Sch	J. H. ORNE	67
1869	Sch	OCEAN BELLE	67
1869	Sch	WHITE EAGLE	70
1870	Sch	OCEANUS	47
1870	Sch	DAUNTLESS	69
1871	Sch	E. L. ROWE	68
1871	Sch	WM. H. FOYE	70
1872	Sch	MARY O'DELL	48
1872	3m.Sch	WALTER B. CHESTER	420
1873	3m.Sch	AJAX	319
1873	3m.Sch	GEORGIE SHEPARD	585
1874	Sch	UNCLE JOE	63
1874	3m.Sch	WILLIS S. SHEPARD	475
1875	Sch	MARTHA C.	79
1875	Sch	HENRY FRIEND	67
1875	Sch	HERBERT M. ROGERS	77
1875	Sch	GEORGE A. UPTON	56
1875	Sch	LIZZIE	72
1876	Sch	ALICE	89
1876	Sch	WINIFRED J. KING	63
1876	Sch	GATHERER	95
1876	Sch	NIMBUS	60
1877	Sch	WILLIE M. STEVENS	80
1877	Sch	GOLDEN HIND	74
1877	Sch	MARION	82
1879	Sch	SARAH M. JACOBS	80
1879	Sch	REUBEN S. HUNT	182
1880	Sch	HORACE ALBERT	68

THE PERIODICAL PUBLICATION **LOG CHIPS** OF RECENT MARITIME HISTORY

46

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THE SHIPBUILDERS OF BATH, MAINE
IX. THE MINOTTS OF PHIPPSBURG

Properly speaking, Phippsburg perhaps is not part of Bath, but it lies only a few miles below Bath on the right bank of the Kennebec and its shipping was registered as of Bath, so we have no hesitation in including its builders among those of Bath.

The leading builder of square-riggers at Phippsburg was Charles V. Minott. Mrs. Charles V.Minott Jr., who still spends her summers at Phippsburg in the family mansion, has furnished us most of the information in the following account.

The shipbuilding story at Phippsburg begins in colonial times, when James McCobb (1710-1788) was the leading capitalist of Phippsburg Center. He was survived by two sons, Samuel, who died in 1791 before his father's estate was finally settled, and Thomas. Thomas McCobb joined with his step-brother, Mark Langdon Hill, to carry on the family business as Hill & McCobb. In December 1808 they sent the brig MARY JANE to sea in defiance of the Embargo Act of that year.

Thomas McCobb died in 1815. His widow, Rebecca Hill McCobb, the following year married Parker McCobb, who was the son of her late husband's older half-brother Samuel and had been looking after her financial affairs. Parker McCobb had a sister, Beatrice or Betsy, who married Colonel Andrew Reed; they had a son named William Maxwell Read who married Caroline Drummond and who also was associated in the family business.

Mark Langdon Hill died in 1842, following which Caroline's brother, Captain James Drummond, began buying up the interests of the other members of the family. The following incomplete list gives vessels which various of the above individuals are listed as owning about this time:

Owned by M.L.Hill; built at Georgetown

1796	Sch MARK & MARY	112 tons
1799	Ship MAGISTRATE	228
1800	Sch MERCATOR	105
1801	Brig PATRON	162
1803	Brig MARY JANE (at Hallowell)	156
1804	Brig THOMAS	187
1805	Ship HAMILTON MOORE	345
1806	Sch EVELINA	112
1809	Ship MOUNT HOPE	384
1818	Sch SALMON (at Phippsburg)	62

Thomas McCobb was listed as first master of MARY JANE, HAMILTON MOORE, and MOUNT HOPE.

Parker McCobb owner, built at Phippsburg:

1809	Brig CHANCE (at Georgetown)	199
1817	Sch REBECCA	60
1818	Sch HENRY	52
1819	Ship DARIEN	295
1821	Brig CUBA	216
1822	Brig REBECCA	156
1823	Brig ARAB (at Bath)	275
1825	Brig CORA	220
1832	Brig JAMES McCOBB	170

Parker McCobb was first master of the CHANCE and of the brig ULYSSES of 1803 and ship PALLAS of 1811.

Wm.M.Reed owner, built at Phippsburg:

1832	Sch MADAWASKA	131
1841	Brig CREOLE	146

James Drummond owner:

1796	Brig HAZARD (Georgetown)	169
1817	Sch JANE (Phippsburg)	37
1838	Ship HANOVER (Bath)	577
1847	Ship T.J.ROGER (Bath)	543
1849	Ship SARATOGA (Bath)	1200
1850	Ship MAZATLAN (Bath)	462

Captain James Drummond was first master of HAZARD, HANOVER, and SARATOGA, and of the following other Kennebec-built vessels: sch.POLLY (1792), ship NON PAREIL (1795), brig JOHN MARSHALL (1823), sch.SUKEY (1825), brig CALEDONIA (1828), ship BIRMINGHAM ('36), ship NORWAY (1839), ship NORTH CAROLINA (1840).

In 1853, Charles V.Minott joined in partnership with Captain Drummond at Phippsburg. Charles Vincent Minott was born at Bowdoin, Me., 13 Oct.1826, son of Thomas and Frances Minott. In 1845 he left home to work in

This issue goes to press on 17 May 1955; we hope to catch up some day.

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the shipyard of Levi Houghton at Bath. Although he had only a common school education, he undertook to teach himself the finer points of the profession, and among his books still in the family is a copy of L. McKay's "Practical Shipbuilder"(1839) with the flyleaf inscribed "Charles V.Minott's book,Bath, Maine, Jan.30, 1847." Two years later he went to the yard of Joseph Berry in Georgetown, and in 1850 he became Berry's master builder.

He must have worked on some, if not all, of the following vessels built by Berry in the next few years:

1850	Ship	HARRIET	534
1851	Sch	SAMPSON	128
1851	Ship	MONGOLIA	960
1852	Ship	MARY E. WHITTIER	495
1853	Bark	SILVER CLOUD	451
1853	Ship	SULTAN	1184

When he first came to Phippsburg, C.V. Minott built the brig NEBRASKA at a spot on the Kennebec shore near where a church and three houses are still standing. Then he joined Capt.Drummond in the other yard, where there were shops, a tide-mill dating from 1795, and a stone general store building erected in 1806 and still standing. He bought the old McCobb-Hill house, married, and lived out the rest of his days at Phippsburg. After Drummond's death in 1882, Minott bought the Drummond equity from the heirs, and as he had been buying up other McCobb-Hill titles for some years he finally became sole owner of the local land and business that had originally belonged to James McCobb.

Here is the list of vessels built at Phippsburg by Charles V.Minott:

1854	Brig	NEBRASKA	309
1854	Ship	CORTES	582
1856	Ship	AMORIEL	529
1856	Ship	CHARLOTTE A.MORRISON	570
1858	Bark	COMET	469
1859	2m.Sch	FLYING DUTCHMAN	49
1860	Ship	TIGER	1073
1862	Bark	ALICE MINOTT	505
1863	Ship	MARY E. RIGGS	1124
1864	Brig	VINCENT	409
1865	Bark	C. V. MINOTT	443
1866	2m.Sch	SARAH L. HARDING	60
1867	Ship	ALICE M. MINOTT	1093
1868	2m.Sch	HYNE	155
1870	Ship	MEROM	1204
1870	3m.Sch	ORIZON	58
1871	3m.Sch	SENORA	222
1872	2m.Sch	RIVAL	129
1873	2m.Sch	J. C. ROGERS	97
1874	3m.Sch	CORA	350
1874	3m.Sch	J. D. ROBINSON	470
1878	Ship	STANDARD	1534
1879	2m.Sch	MENTOR	82
1881	Ship	JAMES DRUMMOND	1556
1882	Ship	BERLIN	1552
1883	Ship	ST. CHARLES	1749
1885	3m.Sch	ST. THOMAS	742
1888	2m.Sch	BEN HUR	89
1890	Ship	ST. MARY	2043
1891	4m.Sch	MEROM	925
1893	Ship	ARYAN	2123
1896	4m.Sch	FRANCES M.	1228
1901	4m.Sch	ADA F. BROWN	1456
1904	5m.Sch	MARCUS L. URANN	1899

The MARCUS L.URANN was on the ways at the time of C.V.Minott's death in May 1903. She was completed by C.V.Minott Jr. and launched 25 Oct.1904. The wharf gave way under her as she began to move at the first launching attempt, and it was some days later before she actually was put afloat.

Charles V.Minott Jr.was born in Phippsburg 12 Sept.1867, and graduated PBK from Bowdoin in 1891. He worked with his father as secretary, accountant, and business representative. After 1904 he abandoned the shipyard, but continued to manage the Minott fleet until World War I. Then he sold out at very advantageous prices, keeping only (for sentiment) a small share in a Bath-built vessel. Thereafter he wintered in Boston, where he died in March 1938. His sister, Alice M.Minott, for whom two square-riggers were named, was born in April 1860 and died in June 1934.

Almost all the Minott vessels were built for their own management. The URANN was an exception, having been built for the Coastwise Transportation Co. She was named for the head of the Ocean Spray Co. of Cape Cod, and Christmas boxes of cranberries still come to members of the Minott family.

The ship ARYAN of 1893 enjoys the distinction of having been the last wooden full-rigged ship built in North America, and probably in the whole world, with the possible exception of India, Burma, or Siam. She was launched from a narrow strip of land between the Kennebec River and the road from Bath south to Popham Beach. While she was on the ways, passersby went beneath her bowsprit, which extended over the highway, some 90 feet above the ground. Today only some rotten scraps of timber that once were building ways give a clue to the visitor that here is the spot that marked a turning point in the maritime history of the United States.

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May 12, 1965

MR. ANDREW J. NESDALL
250 Quinobequin Road
Wabin 63, Massachusetts

Dear Mr. Nesdall:

I must apologize for not having answered your letter of April 24, 1965 at an earlier date but I have been trying to accumulate some material for you along the lines requested in your letter. Accordingly I am enclosing Xerox copies of the following letters which may be of interest to you:

(1) Letter from Mr. Frank A. Palmer to Mr. C. N. Minott dated December 6, 1926.

(2) Letter from Mr. C. N. Minott to me dated February 1, 1927.

(3) Letter from Mr. Frank A. Palmer to me dated March 11, 1927.

Between these letters you may be able to collect the information which you desire.

I used such dimensions in the building of a model of the JAMES DRUMMOND in which I have had a special interest in view of the fact that the father of a cousin of Mrs. Lynn, Capt. Alva M. Curtis, commanded this vessel at one time. I visited Mrs. Haggett at her Phippsburg home last summer and acquired a copy of her new book which I found most interesting

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in covering the early history of Phippsburg. I am familiar with the site of the former Minott shipyard as I have been spending my summers in Maine where Mrs. Lynn was born. My last trip there was last January to attend the funeral of her cousin, Dr. Wilbur F. Browne of Brunswick.

The JAMES DRUMMOND measured 1557 tons and her dimensions were 216 x 40.1 x 24.2. As you know she was built in 1881.

Very truly yours,

Donald J. Lynn

DJL:mm
Enclosures

COPY

Bath, Dec. 6, 1926

C. N. Minott, Esq.

My dear Sir:

Yours received, am enclosing my dimensions of the ship as I took them. There are a few things I will explain as they may not be exactly plain to you. The distances from "Fore to Main" are the length between the masts from center to center. From Fore to Kt Heads, is the distance from center of Foremast to about where the stays set up in the bow, "bowsprit Outboard" is the distance from there to the end of the Bowsprit. "From Mizzen to Taffrail" is from the center of the Mizzen mast to the Rudder-Head, 35 ft. The 10 ft, is from there to the taffrail. The depths given are what the masts buried from the top of the deck plank to the top of the keelson. You will have to estimate the height of the keelson and you will notice there is one foot to be added to the widths. Probably the rail was not on when I measured, and the foot to be added is what it, the rail, projected outside of the top timbers, 6 inches on each side. The "Height of Rail" given 4' x 4" is the height from the top of the deck plank to the top of the rail. The foot to be added was the height of the Deadeyes above the rail. "Bowsprit Outboard" is length of bowsprit from where the stays set up in the bow to outside of the cap on the bowsprit. "Stays in on the Bowsprit" means that the

Fore topmast stays were 14 ft. in from the outside of the cap on the bowsprit. Then the Forestay was 5 ft. inside of that again. The inner jib stay set up through a bulls eye on top of the cap on the bowsprit. "Jibboom 18' x 10' x 2'. The outer jib stay went through the boom at the first shoulder. The fore topgallant stay at the second one. The Fore topgallant stay had a "jib topsail on it". "Foremast 80 ft Head 14 ft". That means that the Foremast was 80 ft. long. Including the head. The other masts and Topmasts the same, Heads included in the lengths given. Topgallant masts "28 x 18 x 8". That means Topgallant mast 28 ft., Royal mast 18 ft., Pole 8 ft. Lower yards 80 ft. Arm 2' x 6" means that the Fore and Main yards were 80 feet long including the arm. All the other yards the same. "Stays forward of Foremast" means that the Bitts where the main and main topmast stays set up were two feet forward of the foremast.

Please let me know if you receive this all right. If you understand it all right and if it will answer your purpose.

Yours truly,

(sgd.) Frank A. Palmer

712 High Street
Bath, Maine.

COPY

"JAMES DRUMMOND"

Minott's Ship 80

From Fore to Knight heads			42 x 6
" " " main			73 x 6
Main to mizzen			62
Mizzen to taffrail			35 x 10
Depths at fore			23' x 7"
" at main			20' x 0"
" at mizzen			20" x 0"
Widths at fore			36'.5"+1ft
" at main			37'.10"+1ft
" at mizzen			35'. 7"+1ft
Height of Rail			4'x4"+1ft
Bowsprit outboard			28
Foremast	80	Head =	14
Main mast	80	"	14
Mizzen mast	75	"	12
Topmasts	50	"	8
Mizzen topmast	42	"	7
Topgallant masts Mizzen			28.18.8 22x 12.6
Lower yards	80	Arm =	2 x 6"
" topsail	72	"	1 x 0
Upper topsail	65	"	2 x 6
Topgallant	51	"	2 x 0
Royal	41	"	1 x 6
Cross jack	65	"	2 x 6
Lower topsail	57	"	1 x 0
Upper topsail	51	"	2 x 0
Topgallant	41	"	1 x 6
Royal	32	"	1 x 0
Jibboom			18-10-2
Spankerboom			52
Mastheads (Tops + breadth			breadth 19 1/2
Mizzen (" + ")			17
Topmast + length			length 13
Mizzen "			11
Trestletrees			8 x 18
Mizzen			6 1/2 x 16
Topmast			5 x 14
Mizzen			4 1/2 x 13
Forward Shrouds - center of mast			
Fore			
Main			
Mizzen			
Spread of Rigging			

Fore	32
Main	32
Mizzen	32
Stays in on Bowsprit	14 x 5
Stays forward of Foremast	2 ft
Tops	12-14
Spread of Rigging in tops	
Main	24 in.
Mizzen	18 1/2
Rake of masts	4/8.5/8.1.to the foot
Bumpkin pendants	
Size of Topgallant masts	
Fore	37" x 29" Sic
Main	37" x 29" "
Mizzen	30" x 24" "
Main Shrouds	45 x 8
Topm "	41 x 4
Mizzen topm "	34 x 5 1/2
Mizzen Royal Bk. Stay	104 x 10
Mizzen topgallant Bk. Stay	93 x 3
Main Royal Bk. Stay	127 x 2
Fore Royal " "	125 x 3
Main topmizzen "	84 x 9
Fore " " "	82 x 6
Mizzen Shrouds	42 x 3 1/2
Mizzen topm Bk stay	74 - 2 1/2
Main topg Bk stay	111 - 1
Fore " " "	109 - 0
Main tops Runner	145 - 10
Fore " "	43 - 1
Main topgallant "	53 - 6
Fore " Runner	50 - 6
Mizzen topgallant "	42 - 0

#92 Moreland St.
Boston, Mass, Feb, 1, 1927.

Dear Mr Lyon;—

Your two letters at hand and their contents noted.

As the ship "James Drummond" was built the year I was thirteen years old and as from my earliest remembrance my father was always building a vessel of some sort it seemed a matter of course to me and I really know very little about this ship.

In 1900 my father built a four masted schooner by which I worked and helped him. The keel of this vessel was made from State of Maine yellow birch and it was hard to get much more than a 40 foot average which made it difficult to get a good job and then the scarphs were short and many of them. This vessels keel was 210 feet long and when it was done my father made the remark to me that it did not look much like the James Drummond keel which was the same length the top tier made of four pieces of Virginia oak 60 feet long with three ten foot scarphs. My father suffered from rheumatism greatly and the ship "Dorothy" built in 1876 was the last ship he himself made the model and moulds for. Wm Patten did the draughting.

[illegible] seven and [illegible] built in 1879 1880 1882 1883. The "James Drummond" wound up her career on the rocks on the Alaskan coast and a few years ago a picture was sent us by a friend in Alaska showing how she was used by the Lighthouse Dept to hang a light on as an aid to navigation in those waters.

In 1849 my father became master builder for Geo Berry, a shipbuilder at Georgetown Maine having left the farm on which he was born and brought up at Bowdoin Maine four years earlier. In 1853 he came to Phippsburg where there was living a retired sea captain whose name was James Drummond and who had some money. Through his help my father established himself in business and built vessels on that spot 50 years until he died in 1903 when he had a four masted schooner in frame which I finished after his death. I suppose as in 1880 Capt Drummond was in failing health — he died in 1882 — my father thought it would be pleasing to him to have the ship named for him hence the name. The hailing port was Bath Me. Sometime when I am at Phippsburg I will get the size and dimension of a house plan which I have there. The forward house was placed aft of the foremast so there was ample passage between it and the belay rail around the mast and it and the large hatch forward of the belay rail around the mainmast occupied most of the space between the fore and main. Aft of the belay rail around the main which also supported a set of wheel pumps at a workable distance was placed a capstan then a smaller hatch and then you entered the after house — two corridors, mates room on the port and 2nd mate on the starboard then you entered the dining room or forward cabin

Yours truly C. V. Minott

Bath March 11, 1927.

Donald J Lynn Esq.

Dear Sir,

Yours received, I am the man who rigged the ship "James Drummond" The dimensions Mr Minott sent you are the ones I used to fit the rigging when the ship was new. Of course they are not quite so plain as I could have made them had I been making them for someone else to use.

She had six Shrouds, Two topmast back-stays, One Topgallant back-stay, One royal back-stay on each side of the Fore and Main. Four shrouds, Two topmast back-stays, One topgaliant back-stay, One royal back-stay on each side of the Mizzen.

12 I think you must mean "Chain-plates". "Channels" were a plank of the same thick-ness of the the main-rail and bolted to it on the outside where the rigging and back-stays came down to the rail, One on the outside of the main rail, One on the out-side at the gunwals. The idea was to

keep the lower dead-eye far enough out so the lanyards would not chafe against the chock on top of the rail (where there was any) the fly-rail round the quarter-deck at the riggin-riggings. The upper channel was about six inches wide, the lower one about 10 inches to a foot. The lower one was wider than the upper to make the chain-plate lead nearer the same angle as the shroud or back-stay. There was one chain-plate to each shroud and back-stay. bolted to the timbers below the lower channel.

(3) "Bolt-heads". The main rail ran clear forward to the Knight-Heads. And was about six inches thick. The Forecastle deck-planks were about 4 inches thick. The "Bolt-Head" rested on top of the main rail And projected outside. The inner end ran in over the deck-plank, generally about to the "Windlass Bitts". The inner end was kept up to compare with the thickness of the rail, leaving a water course under the rest of it. On top of the rail, was a chock running from the center of the bow as far aft as the forecastle deck ran tapering from the bow to the after end

so as to make a good finish. This was fitted up to the "bat-head" both forward and aft, (2 in other words the "bat-Head" was cut out through it) It was was very near the depth of the "cat-head" where it joined it, so as to make a good finish again. The "Martingal Back-Guys" set up at the "bat Heads", but the "Gibboom Guys" were at the ou-ter end, the martingal gear inside of them. ...

16) The Fore Stay, Fore Topmast Stay, Main Stay and Main Topmast Stay were all double. There was a piece of oak about 6" by 3" bolted on each side of the Bowsprit. The Fore topmast stay went through a hole in that 14 feet from the end of the bow-sprit. The Fore stay through another hole 5 feet inside of that. They all set up to "bulls-eyes" in the bow. The main and main topmast stays set up to the bitts in the main deck 2 feet forward of the Foremast. The Mi-zen Stay was single and set up through a "bulls-eye" in a band on the after side of the Mainmast about 9 feet above the deck. The 2 inner fib stay went through a "bulls-eye" on top of the cap at the end of the bowsprit and set up at the knightheads

The Miggus topmast stay set up in the main-top.

(8). All the dimensions are given in feet and inches. Sizs of topaliant masts. That is really not the sizs of the topgallant masts but the heel of the Royal mast where the topgallant rigging goes. The figures given are the circumfrence of the mast there in inches. That I used to fit the eyes of the rigging from. There was a shoulder there of about three fourths of an inch there, So the sizs of the Fore and main topgallant masts in the caps was about 14½ inches. The Miggus about 11½ inches.

Rake of masts ¼ - ⅝ - 1" to the foot.

If not too late, I would not rake the Miggus more than ⅝" to the foot. They never got the miggus-mast to rake as much as they talkid of. And it will make a much better looking job if it dont rake more than ⅝" to the foot

Spread of rigging in Tops.

There were three Topmasts Shrouds on each side of all the Topmasts, set up in the Tops

The Tops are circular on the forward side straight on the after side. The after shrouds set up near the after corner of the top on each side, The next one 24 inches forward of that. The next 24 inches forward of that again the Higgins, The same idea, with a spread of 18½ inches

The length of shrouds given is the length from the bottom of the "dead-eye" to the centre of the eye, (as we term it) The shrouds are fitted in pairs, In other words one pair makes two shrouds which are seized together so as to fit the mast-head, And are put on alternately, one on one side, the next on the other and so on. The topmast back-stays are the same. The trestletrees and ~~and~~ mast-heads as well as the lanyard with which they are set up all have to be considered in connection with these lengths, So I should pay no attention in rigging the models to the lengths given on the paper sent you. If you get your hull and spars on correct scale, your rigging can't be very much wrong.

The Cat-Heads are tapered on the top-side. If they were 14 inches on the rail for instance, they would be about 4 inches on the inner end, they are not tapered any this other way. (fore and aft)

The Topmast Shrouds are mostly to put ratlines on, To get up and down from aloft.

The lengths of topgallant and royal back-stays given, Is the length from the side of the mast to the bottom of the dead-eye. The distance between the dead-eyes or "lanyard" as we term it, was about 3 feet in the Shrouds, 4 ft in the back-stays, 1½ feet in the topmast shrouds.

The Chain plates were somewhat after shape to fit over the channels and to side of the ship.

7

Hope this will help you some in your work. If there is anything about it you do not understand, or any questions you would like to ask, let me know and I will help you if I can. Wish I could see the ship when you get her down.

If you do come to Maine, I should be pleased to meet you.

Yours truly

Frank A. Palmer

712 - High St
Bath, Maine.

HAROLD D. FOSS
"SIDELIGHTS"
HANCOCK, MAINE
December 28,1959

Dear Charlie:

Your interesting letter was received and please pardon me for the delay in answering. I have a good alibi, just in case that you are interested. Every year Jerry and I put all of the Christmas Cards as fast as they are received in a pile. To save them all and on Christmas morning, the first breakfast we read and comment also reminisce. This is a custom. Your letter was put with the cards and I therefore did not read it until we were about to sample the egg nog.

First I feel like I am one of the share holders, 1/64th, of your model and I am pleased to add anything that I can. Now about the boom tackles;

Fore boom tackle is always in use. The single block, hooks in a strong eye on top the rail, close to the fore rigging. When tacking the fore sheet is run out and the block is taken in on the boom tackle and is always made fast to a belaying pin on the windward side of the boom. The belaying pin is through the jaw of the boom about one foot behind the mast. There are of course two belaying pins, one of each side of the boom, as one must use the windward side. The strap under the boom is to hold the single block when not in use. You do not ever use anything but one single block and one double block for any boom tackles. I never heard of double and triple blocks in use for boom tackles. The main and mizzen booms are (when not close hauled) using boom tackles just as the fore. Always heavy strong eyes fastened in the main rail close up to the rigging forward.

The after sail supposed to be the Spanker has a boom tackle (single and double block) made fast the same way. But in addition it has a boom pennant. The wire boom pennant, forward end is made fast or hooked into the same eye that mizzen or main is hooked in. The afo end should be right close to the Spanker rigging and the link where one hooks the single close by the strong eye where the single block is hooked when the sheets are trimmed aft.

RE: The is only one roofing tackle and that is for the Spanker or aft sail. The single block is hooked in the roof crinkle, the double block in the ring at the end of the boom. The crew haul this taut standing on top of the after house and when out enough, make the rope fast to a cleat which is fastened underneath the Spanker boom. When shaking out a roof the first to do is to let go the tackle rope. In port the boom pennants are generally (one on each side) strung up in the rigging. Not the Spanker rigging but the rigging where the forward end is hooked.

HAROLD G. FOSS
"SIDELIGHTS"
HANCOCK, MAINE

We do not need pennants on any other boom , excepting the Spanker, because the other booms do not go out beyond the ship's rail. Whereas when running free the Spanker can be almost out at an 90 degree angle. In jibing over it took a good man to slack away the boom tackles, that is if the wind was frosh. Many a man has been hurt that way. In jibing over the General E.S.Greeley, Capt. Tullock got killed by the Spanker boom tackle.

In tacking if the schooner was light and she was a wee bit slow, we used to let the Foresail way out, and catch her aback to push her around. Then we would take the Spanker boom tackle accross the deck, hook the single block in a strong eye bolt on the windward quarter, take the end to the winch head and haul the old tub's stern up to windward, I maan the Spanker, and in this way, the old gal had to tack.

Please do not hesitate Charlie, to ask me any question that you want answered about the schooner's rigging or anything else and it is a pleasure to answer them.

Glad that you liked the Shay story. It is absolutely all true. I am sure that never before or since has one Sailing vessel ever rescued a crew and then salvaged the vessel for good measure. I did not say what happened to one of the Shay's seamen who gave me a bit of cheek when I went forward in the morning to get them out and help get the tow line to the Shay. The only reason that I wrote that story was that John Lyman has been asking me to write it. I am going to wait and see how it went over and I might write one ot two others. I find that it is hard to write stories without using that big I, and I at least wish to be more or less modest.

With kindest regards and wishing a happy new year for you and yours, I am,

Sincerely,

Harold

THURSDAY, MARCH 1, 1973

The New Yo

Mystic Restoring An 1841 Whaler

BY FRANK PRIAL
Special to The New York Times

MYSTIC, Conn.—They are getting ready to refloat the Charles W. Morgan.

The rugged, 113-foot whaling ship is the sole survivor of the great New England whaling fleet of the mid-19th century. She has been landlocked in a bed of sand since 1941, when she first came here to Mystic Seaport, the country's best-known maritime museum.

The Morgan's rebirth, tentatively scheduled for next fall, will be the culmination of an extraordinary program of research and pioneering restoration work that has been under way since 1965.

"What we have here," said Waldo C. M. Johnston, director of the seaport, "is a whole new science: ship geriatrics."

Movement Gains

The Morgan, along with the Wavertree at the South Street Seaport in New York City, is one of the most famous vessels undergoing extensive restoration in this country. But the movement to preserve old ships and maritime artifacts is gaining momentum in seafarming nations around the world. In fact, the first international congress of maritime museums was held in London last fall.

Mystic Seaport is concerned with the entire maritime history of New England, and the Morgan is only one of its projects. But the three-masted Morgan is the flagship of the Mystic fleet and there is no doubt that her restoration is the most important project now under way.

To date, the project has involved everything from painstaking studies of wood technology, including specific-gravity tests of 200 borings from the 132-year-old ship's hull, to searches for specific timbers, such as hackmatack, a variety of larch, to be used for special braces in the ship's sides.

"Hackmatack was used by the original builders in 1841," said J. Revell Carr, curator of the seaport, "and the whole idea of this restoration is to proceed exactly as the original builders did in the 19th century."

Hackmatack, or tamarack, used for braces between

to keep the old vessel intact as a working ship. "We decided to save the life of the old girl to keep her alive and visible for future generations," Mr. Johnston said.

Ultimately, Mr. Johnston said, the decision was made to do a complete restoration, in part because Mystic Seaport is uniquely equipped to tackle such a project.

Full Shipbuilding Facilities

Among the facilities at the seaport, which is formally known as the Marine Historical Association, is a complete shipyard where a new Charles W. Morgan can be built from the keel up. The seaport has its own rigging loft, capable of rigging any major sailing vessel; its own sail loft, which can sew a complete 13,000 square-foot set of sails for the Morgan, and its own forges to fashion iron fittings. There is even a saw mill to cut ship's timbers from the seaport's own store of seasoned logs.

"We want to preserve not only the vessels but also the tools, the skills, the expertise that originally were use to build them," Mr. Johnson said. Some of Mystic's craftsmen, now in their 70's learned their ship-building skills in the days of sail.

Others, younger men, left such careers as computer programing and teaching to become shipwrights.

"You work nights and weekends here," said Maynard Bray, the shipyard's youthful supervisor, "but there is a deep satisfaction to this kind of work. Not many people will ever again have a chance to experience it."

The New York Times/John F. Urwiller

The Charles W. Morgan, a 19th-century whaling ship, is being restored at Mystic Seaport, Mystic, Conn.

cause its roots extend from the trunk of the tree at almost a 90-degree angle. Each tree provides a single brace or "knee," fashioned by nature into a section of immense strength.

Convincing the Farmers

"To find the trees—they're all in Maine—is one thing," Mr. Carr said. "Convincing the farmers to let us have them is another."

The Charles W. Morgan was built, almost two decades before the Civil War, at the yard of Jethro and Zachariah Hillman in New Bedford, Mass., then the whaling capital of the world. Mystic had whaling ships of its own, but was known mostly as a shipbuilding community then.

In her working life, of almost 80 years, the Charles W. Morgan made 36 voyages to the South Seas. She brought back 54,483 barrels of oil and 152,934 pounds of whalebone. Over the years more than 1,000 men sailed for the Morgan as officers or crew.

The ship was exhibited at Round Hill in Rhode Island until the seaport here acquired her in 1941. Her present position is at a wharf at the seaport, where, from the distance, she appears to be afloat. At high tide, the waters of the Mystic River come up around the ship's sides and even flow into the hull to supplement the tons of the concrete block ballast that keep the Morgan settled solidly in the sand.

"Floating her is a far more delicate operation than it may seem," Waldo Johnston said. "After all, no one really has seen her bottom since 1941."

Safety and Integrity

Mr. Johnston said he had two main considerations in mind in the course of floating the Morgan: "the safety of the vessel and the integrity of restoration."

"The easiest thing to do would be to fill her hold with cement and make it just a stationary platform for the upper decks and the rigging," he said. "We thought hard about that possibility, believe me."

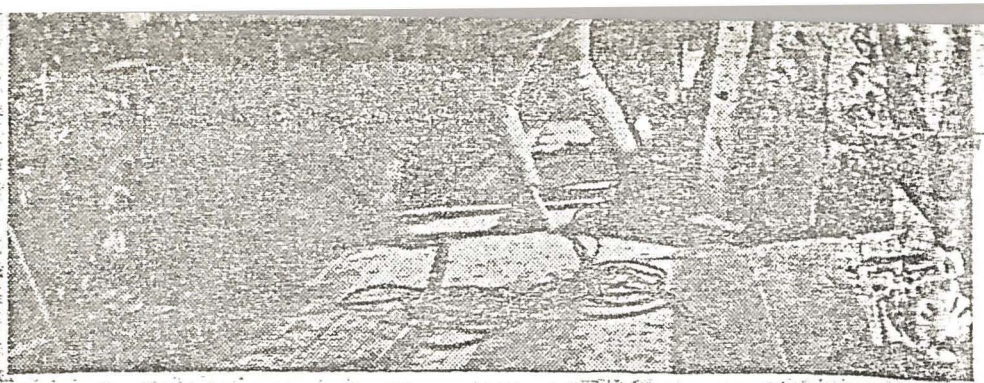
Instead, the seaport chose

Woman Friendly to Dogs Gives Mailman Some Help

PITTSBURGH (AP) — The mail for one Pittsburgh area got through recently because Gerri Miller was a friend of dogs.

When she saw a substitute mailman cringing back from neighborhood dogs, she said, "Give me your mail. "I'll take care of the rest of the deliveries on this street. I know all the dogs and they won't bother me!"

The mailman did



Henry Jarvis, right, a master builder, and his assistant, Lee Palmer, removing an old brace, or "knee," from between the hull and a crosspiece. It will be replaced by a tamarack tree root, used originally as it formed a 90-degree angle of great strength.

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News Summary and Index

THURSDAY, MARCH 1, 1973

The Major Events of the Day

International

The White House said yesterday that North Vietnam had given new assurances that the return of all American prisoners of war would be completed within the 60-day time limit established by the Paris truce agreement. The pledge, reportedly made at the Paris conference on Vietnam, did not specify when the next contingent would be released. [Page 1, Column 8.]

Some intricate diplomatic maneuvering in Paris seemed to ease the crisis over the delay in the release of American prisoners and to pave the way for concluding the conference on Vietnam. [1:6-7.]

The dispute over the prisoner release reached Haiphong harbor, where a Navy minesweeping team was abruptly withdrawn, according to military sources, who said the operation would not be resumed until Washington was assured the prisoners would be released without delay. The mine-clearing force had reportedly just begun to clear the harbor when the ships and helicopters abandoned the task. [1:5.]

Britain began to feel the effects as the fight against the Government's anti-inflation measures bit deeper with more disrupting strikes. A day after 250,000 civil servants walked off their jobs, the one-day strike technique was taken up by 29,000 locomotive engineers who brought the railroad system to a standstill. [4:3.]

After years of rising deficits, the Italian Government has finally read the message of the jet trails in the sky and has submitted a bill in Parliament to withdraw the nation's state-subsidized passenger ships from trans-Atlantic runs. Though the full phaseout of all 14 vessels is expected to take five years, the luxury liners Michelangelo and Raffaello will be withdrawn much sooner, perhaps by next year. [1:8.]

National

Militant Indians holding at least 10 hostages in the historic South Dakota settlement of Wounded Knee exchanged gunfire with Federal officers, who surrounded the Oglala Sioux hamlet. The Indians demanded Government investigations into Federal treatment of Indians, and vowed to hold the hostages until they got answers. [1:1-4.]

John T. Dunlop, director of the Cost of Living Council, plans to intervene in wage negotiations to prevent inflationary settlements, according to a council official, who outlined the council's approach to Phase 3. The official said that Mr. Dunlop, a highly skilled mediator, preferred to head off excessive settlements in negotiations rather than to have the council roll them back after a formal review. [1:1.]

A Government agency is investigating a secret $200,000 contribution that President Nixon's campaign organization solicited from a New Jersey financier who is under Federal charges for securities fraud. A spokesman for the General Accounting Office, which administers the campaign spending law, described the unreported contribution by the financier, Robert L. Vesco, as an "apparent violation" of the law. [1:2-3.]

Harry L. Sears, a former New Jersey State Senator, said he had talked Mr. Vesco out of making a $500,000 contribution to the Nixon campaign, but then agreed to arrange for a $250,000 contribution after both Mr. Vesco and Maurice H. Stans, the campaign's finance chairman, asked him to make the arrangement. [15:1.]

The acting director of the Federal Bureau of Investigation told a Senate committee that he had resisted White House efforts to get the bureau's files on the Watergate case, but then allowed the records to be given to a Pesidential assistant. In his testimony before the Judiciary Committee, which opened hearings on his nomination as the F.B.I.'s permanent director, L. Patrick Gray 3d offered to let any Senator see the bureau's files on the case. [1:6-7.]

Metropolitan

Legislative leaders introduced a bipartisan bill in Albany that would abolish the statewide primary for the chief judge of the Court of Appeals. The move was seen as a prelude for Democratic endorsement of Associate Judge Charles D. Breitel, a Republican, as the next chief judge, with the next two openings on the court to be filled by Democrats. [1:2-3.]

The City Council moved toward transferring power to hire school guards from local boards to the central Board of Education, which it believed would be less likely to hire criminals. Hearings on the matter came after three school guards were arrested for

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CHAPTER VIII.—SHIP-BUILDING TIMBER.

At the time of the settlement of her American colonies the forests of England had begun to be severely taxed for a supply of good ship-building timber. During the early part of the seventeenth century the British navy had increased rapidly in importance, and the trade to the East Indies and other distant parts of the world was leading to the production of an immense number of ships. Not only was the consumption of oak for the building of new vessels large, but the warfare continually waged by England upon the sea required the incessant repair of ships and made a demand upon the oak forests of the country for that purpose almost as large as for the building of new vessels. The cultivation of young timber was totally neglected in England, and as the local consumption was large and the forest area small the supply of navy timber grew continually less. As early as 1660 naval officers had already become apprehensive that there would soon be a deficiency of oak timber in England. The price of the wood had nearly doubled in fifty years. The contract price paid for straight timber about 1663 varied from £2 to £2 15*s.* per load of 50 cubic feet, and for knee timber the prices varied from £2 15*s.* to £3 3*s.* per load.

The scarcity of proper timber for the construction of the best class of vessels was a serious matter to a country whose safety in defense depended almost entirely on the possession of a strong navy, and the Fellows of the Royal Society were appealed to for suggestions as to the proper manner to increase the timber supply. The subject was taken up by Mr. Evelyn, one of the Fellows, who recommended "that a universal plantation of all sorts of trees should be encouraged, as the only way of insuring a sufficient supply in the future". Mr. Evelyn agitated the subject of the growing deficiency of timber for forty years, and the facts he presented to the British public so alarmed them that timber trees were planted on private property in almost every part of England, especially in the royal forests, England having in this matter heeded the profitable example of Portugal.

Oak trees large enough for the construction of vessels of considerable size are from 100 to 250 years old, so that these young plantations were not available for several generations after the time of Evelyn. The trees became large enough to cut about the time of the American revolution. A report made by Lord Melville in 1810 states "that the vast quantities of great timber consumed by our navy during the present reign were chiefly the produce of the plantations made between the Restoration and the end of the 17th century".

A fresh demand was made upon the timber resources of England shortly after the Restoration by the celebrated "navigation act", which compelled Englishmen to employ British built vessels only, and a still greater demand sprang up after the independence of the American colonies, from the fact that English merchants could then no longer own a vessel built in the colonies, and had to build their vessels at home. The destruction of British oak increased largely, therefore, year by year, reaching in 1811 about 260,000 loads annually, and although the quantity of timber required diminished somewhat after that date, owing to the fewer losses of ships by war, yet the timber supply continued to decrease also and the price of oak rose steadily. During the war of 1812 English oak brought £7 5*s.* per load, and for thirty years after that it still brought an average of about £6 per load. From the necessities of the case England soon became obliged to rely on foreign countries for a large part of the ship timber she required. The first importations were of white oak from the Canadian provinces; a further quantity was imported directly from America; in fact, every country in the world producing timber of any value was resorted to by the English builders. Many vessels were built after the war of 1812 out of European larch, and a great many others were built out of fir from the Baltic. Pitch-pine was also imported from the United States, and other kinds of timber were brought from the cape of Good Hope and from the East Indies.

After the war of 1812 there were several periods of great stagnation in the maritime enterprise of England. Several investigations into the causes were ordered by parliament, and in 1833 and 1847 the subject was inquired into exhaustively. One of the principal topics discussed by the parliamentary committees on all these occasions was the high price of ship timber and its effect upon the cost of English-built ships. It was shown that vessels built in London cost £28 per ton, and those on the other coasts of the country from £15 to £18 per ton, while vessels built on the Baltic could be constructed for £8 to £10 per ton, the cost in America being from £10 to £12. These differences were almost entirely due to varying cost and abundance of timber. The most serious feature of the high prices and scarcity in England was the fact that the causes were such that there was no room for hope for the future. With the increase in population and progress in refinement the general consumption of timber in the useful arts and the heating of houses had been increasing. More wood was required annually than could be produced by the natural growth of the forests. The high price of food had rendered the land valuable for cultivation, the fields had been cleared and plowed, and there had been an utter neglect of the planting of young trees on land that could not be tilled. Besides that, under the protecting legislation of England, the requirements of the merchant navy were constantly increasing, and the manner in which estates are owned in England soon interposed an obstacle to the cutting of timber even where forests still existed. At the time that the building

of iron vessels became an industry the English oak was virtually all gone, and the difference in cost between the ship built of timber and the one built of iron was hardly worthy of mention. The invention of the iron ship was the salvation of the naval art in England, and probably of her merchant marine.

As the English forests were already giving out when colonies began to be planted in the New World, it will be seen that the emigrants enjoyed a decided advantage over their brethren at home in the manufacture of ships—an advantage improved, however, substantially only for the local needs of the colonists themselves. The multiplication of vessels in the colonies during the early part of their history was remarkable.

The country was covered with large, tall trees, suitable for ship-building, and the excellence of the timber was repeatedly mentioned in the reports and narratives of the early discoverers. Foremost were the white-oak trees, growing in dense and almost continuous forests along the whole north Atlantic coast and extending in a scattered way down even into the heart of the yellow-pine region in Georgia. The trees existed in enormous supply, generally had straight trunks, though yielding a great deal of crooked timber, grew from 60 to 80 feet in height, and averaged 3½ to 4 feet in diameter at a man's height from the ground, while sometimes found as large as 8 feet in diameter. Tough, strong, elastic, and, if cut in the right season of the year, durable, this valuable timber has proved the mainstay of American ship-building from the earliest days to the present time. It is especially suited for the frames and vertebral pieces of vessels, and in spite of its weight is the best wood for the planking of the vessels of every size. Such as grows near the sea-coast and in the swamps is remarkably free from defects of every kind, and so abundant was the timber once that early builders used nothing except the heart of oak in their vessels, sawing off the outer or sap-wood and selecting nothing except the durable inner portion. The fastidiousness of the builders led to an unnecessary destruction of the tree, for of timber thus handled at least one-half becomes waste. So cheap was American oak that vessels built of it for the first hundred years cost only about one-half the price of oak vessels in Europe. It was at first supposed that no timber should be put into a vessel's frame except that which had a natural curvature, and when the crooked timber had been culled from the forests there was some doubt whether its place could be supplied. A practice soon became general, however, of hewing the frames out of straight timber; a practice due to necessity, but found to answer nearly as well. The discovery led again to a great destruction of timber. It is estimated that frames cut from the log or from flitch waste at least one-third and often one-half of the original tree.

The causes which led to the disappearance of the oak in England also came into operation here, and within the recollection of persons now living the white oak has almost entirely disappeared as a ship-building timber in the states in which that industry has been the most actively carried on. In Maine virtually all of the oak accessible from the coast is gone, and only a few small and scattered bodies of it now exist. It is thought that in the western part of the state, in the vicinity of Wells, there is oak enough still left to supply the frames of about 200 vessels; but it grows largely on property where it is valued for its effect in the landscape, and cannot be utilized commercially. The white oak was not indigenous to the valley of the Kennebec to the north of Waterville, nor on the Penobscot north of Bangor, but it did grow inland as far as those points. Many of the more inland bodies of it were not reached for many years; but the construction of railroads finally brought them all into market, and the urgent demand for timber has led to their destruction. There are oak trees of the red and other species (very good timber) found in the mountainous and broken parts of Maine; but they are not at present accessible, nor do they exist in quantities sufficiently large to add materially to the resources of that state for ship-building timber. Owing to the great scarcity of oak on the coast people have lately been compelled to use trees of second growth and all the poorer varieties which, fifty years ago, no Maine man would have introduced into his vessel. It is not to be supposed that the gradual wasting of the forest wealth of Maine has been allowed to go on without remonstrance from the state government. In 1868 the board of agriculture of that state aroused the attention of the landholders to what was going on, the facts coming to many minds with the force of a new revelation; and in consequence of the alarm then existing the people of Maine began to cherish their forest trees as never before. It is believed at Augusta that in the older and better settled portion of the state the amount of growing wood and timber is now suffering no material diminution, and it is thought by some that the area in the state devoted to forestry is now larger than it was twenty years ago. It is to be borne in mind, however, that this is chiefly due to the fact that ship-builders have been driven to other states for the material for their vessels, especially for those of a large class, and having found in the southern states a sufficient and cheap supply, they have for the last twenty years been importing into the state all the timber they needed. This circumstance is giving the forests of the state a chance to rest and recuperate; meanwhile, the state is left without a local supply of oak, and is entirely dependent on the resources of other parts of the coast.

The southern part of New Hampshire was once densely covered with oak, and the Portsmouth vessels were always constructed from local timber. Both on account of the excellence of the wood and the good workmanship of the builders there was a time when New Hampshire vessels got the best rates of insurance in the country, but all of the timber within easy distance of the coast has now disappeared. The northern part of the state is stocked with red oak, intermingled with other timber, and when railroads are built in sufficient number to cover that region a great deal of timber will come into market; but there is no prospect at present of this being done in time to benefit the decaying ship-building industry of the state.

In Vermont white oak is still in fair supply, and is scattered over a large part of the state, more especially in the counties bordering on lake Champlain. The woods have been much culled near the rivers and lakes, but what is left is small and of good quality. Vermont has enough oak for her own limited use for a long time, with some to spare. Owing to the lack of cheap transportation much of it will not be called for until the supply elsewhere becomes so reduced that the increased price will pay the cost of hauling long distances, and by that time the supply will probably be much lessened by local consumption.

In Massachusetts nearly all the oak is gone. It is stated that, while a certain amount is still to be found in the state, much of it is preserved as a feature of patriarchal estates, and little ever comes into market except by reason of the division of estates and the necessity of paying off legacies, when the oak is cut and sent into the market as a means of raising ready money. Massachusetts oak is of excellent quality.

A small supply of oak is still to be found in the state of Connecticut; but ship-building has almost ceased in that state, and were the industry ever to reach considerable proportions again the supply would not last more than a few years.

A large part of New Jersey was originally covered with the finest white oak, but the clearing of the land for cultivation and the use of oak in the general arts has nearly removed the timber from the state. For a long period forests of this timber flourished almost untouched in the southern part of the state, but the railroads have made it accessible, and it is disappearing at a rapid rate. There are only a few places left where oak timber of any size can be cut. A little of it can be found in the vicinity of May's Landing, there being several hundred trees of large size in and around that village from 12 to 25 inches in diameter and ranging in age from 80 to 200 years. There is also a good deal of the timber in the vicinity of Maurice river, where for the last thirty-five years a considerable number of fishing and coasting vessels have been built every year; but practically the white oak is so nearly extinct in New Jersey that, except on Maurice river, the builders do not depend upon it for the frames of their vessels. The sloops, schooners, and brigantines built in eastern New Jersey are nearly all framed with Jersey yellow pine; the planking and center work only are of oak.

The largest oak forest now existing, growing close upon the Atlantic coast, is on the peninsula of Delaware and in the states of Maryland and Virginia. This region has been resorted to by the ship-builders of Maine, Massachusetts, and New York for more than fifty years. The timber originally covered the whole face of the country from the Delaware river to Chesapeake bay and beyond, and the trees were so tall that the majority of them would yield logs 2½ feet square and 60 feet in length without a spot or defect, the moist lands in which they grew and the exposure to the breezes of the sea being particularly favorable to the production of durable timber. Delaware and Maryland white oak became famous more than fifty years ago for its lasting quality and its general excellence. The possession of this abundant supply of cheap timber led to no great development of the ship-building industry of the states in which it grew; nine-tenths of all the oak felled upon the peninsulas has been cut for exportation to northern markets or to Europe. Serious inroads had already been made into the supply at the time of the war of 1861, and during that war, to supply the demands of the navy, an immense quantity of it was cut. At one time there was serious apprehension of the entire failure of the supply of large timber, and large quantities of it were cut and transported to the north for storage in the navy-yards, so that at least the government should not be without material for building vessels. At least one-half of the face of the country on the Delaware, Maryland, and Virginia peninsulas is still covered with a thick growth of oak trees, but nearly all the first growth near navigable water has now been removed. It is supposed that Worcester county, Maryland, has more oak than any other locality at present, as there was very little cut in that county before the railroad was built through it a few years ago; but since a way of transportation has been opened wood-cutters have been operating there vigorously. There is now very little good ship-timber left in eastern Maryland, except in that county, and it is estimated that in twenty years' time, at the present rate of consumption, the whole supply of large pieces for ships' frames will have been destroyed. The growing scarcity of large trees is illustrated in part by the rise in price of timber standing upon the stump. In times past it has been bought for $1 a thousand feet, standing in the tree, and even at the present time, in counties having a great deal of it, the price is sometimes as low as that; but the usual price at present is seldom lower than $3, even in places where it is difficult to get it out, the average from $4 to $10 a thousand, and before the trees have been felled, hewed into frame timber, and transported by water to Maine the value has risen to $35 a thousand feet. If the second growth of oak in this region were as good as the first, and if the demand for the timber were limited to the requirements of the United States alone, it is probable that several generations would elapse before the price would rise much higher. But it is found, in the first place, that the second growth of oak is not so good as the first. Owing to the gradual clearing up of the country the soil has grown drier, or some other change has taken place which seems to affect the quality of the timber, and many of the local builders in Delaware and Maryland who are familiar with the timber resources of their states believe that the first growth of white oak can never be replaced and that the destruction of timber now going on is permanent. In the next place, the demand is not limited to the United States, Delaware and Maryland white oak being now sent to the Canadian provinces and to Europe in large quantities. The finest pieces, intended for keels, stems, stern-posts, rudder-posts, etc., are cut expressly for the Saint John's market, and this trade has grown so large as to hasten materially the disappearance of the timber.

There is good oak in the Alleghany region south of Pennsylvania extending nearly to Georgia, but it is too far away from the sea to be cut for ship-building while any considerable quantity remains in the coast counties of Delaware, Maryland, and Virginia, and, though cheap where it stands, the expense of bringing it down for shipment would be considerable.

Along the northern lakes the white oak has disappeared with the same rapidity as on the sea-coast. Originally the country was covered with almost one unbroken forest containing oak, pine, hemlock, and hard-wood from lake Champlain to the head of lake Superior; but in the place of this grand growth of timber there now exists an almost unbroken series of cleared and cultivated fields and thriving cities for a distance of more than a thousand miles. A few small forests remain, as in the Adirondack region in New York and on the peninsulas of Michigan and Wisconsin, and some oak remains scattered in small quantities all along through the tier of states bordering on the lakes, but nine-tenths of all the timber is gone. Professor Sargent predicts that what is left of some varieties will be cut off in twenty years, and one need only go into the ship-yards on the lakes to learn that an oak famine is impending. Even in Michigan, where the best white oak in the West is found, people are now importing timber to some extent from Canada in order to eke out the local supply, and more than one large owner of tonnage on the lakes has told me that on account of the diminution of the oak supply he expects to convert his property into iron vessels in the course of a few years. The western forests have been the more severely taxed for oak because that is the only good timber the builders of the lakes have had. They are too far from the southern market to buy pitch-pine, and their white pine is too soft and perishable for use in vessels except for decking, beams, houses, and spars. Lake vessels are framed, planked, and ceiled with oak. This fact, and the general demand for oak timber for houses, cars, and other local purposes, its exportation to the East and to Europe, the clearing up of the country, and the disastrous losses by forest fires, have caused the trees to disappear with remarkable rapidity. The wood has become so scarce that the price of flitch oak has risen from $10 per thousand board feet to $20 in the last twenty years, while squared oak has risen from $15 to $25 per thousand feet, and plank to $30 and $35 per thousand.

While speaking of oak, mention should be made of the forests of the Ohio River valley. The greatest hard-wood forest in the country originally grew over the face of the territory extending from Arkansas and Missouri eastward all along both sides of the Ohio river, and up the Cumberland, Tennessee, Kanawha, and other great branches of the Ohio to the mountains of Virginia, and over the mountains down to the coast. On the northern side of the Ohio the oak has been pretty well cut off, except in scattered lowlands; but on the southern side of the river, in West Virginia, Kentucky, Tennessee, and western North Carolina, and away west in Missouri and Arkansas, there is an abundance of white-oak timber. Now that coal is the popular fuel used on river steamboats and in railroad locomotives the felling of timber is going on more slowly, and some of the forests are practically uninvaded. There is probably more white oak in that region than in all the rest of the country put together, and there are immense tracts of trees of large size. The quality is not always so good as that of the coast oak, but there is enough timber growing on moist land to make the wood sufficiently sound for ship-building purposes. The unfortunate feature of the situation is that there is no practicable way of getting it down to market, as the only route to the sea-coast is by way of the Ohio and Mississippi rivers to New Orleans. It could be floated thither in rafts, as it now is to all points along the Ohio river, by felling a certain number of poplar trees, to float the rafts; but the distance is great, and the rafts would continually be lost in the swift current of the river or by getting aground on sand-bars. The scheme is financially too perilous to be attempted, and the cost of freight from New Orleans to the northern yards would in any event be a serious drawback. It is doubtful whether this timber can ever be much used for deep-sea ship-building unless the vessels are built upon the Mississippi river, for by the time that prices on the coast are so high as to warrant the rafting of it to New Orleans or the freighting of it overland by railroad it will probably be as cheap to build ships of iron as of white oak. A good deal of oak is indeed being sent in cars to the sea-board at the present time, but not for ship-building.

From this review it will be seen that the ship-building of the United States cannot probably depend upon the oak supply of the country for many years longer. Were shipping and trade what they were two hundred years ago, the supply might last a long time; but there has been a great change since America was first settled, and timber is now being consumed in a more rapid ratio than formerly. In old times vessels were small. A 400-ton ship was a monster, and a thousand small vessels were a great fleet, worthy of national pride. Less than 200,000 feet of timber would build a large vessel of the days of the pilgrims; on the other hand, at the present time, the coasting schooners of ordinary size require from 300,000 to 400,000 feet of lumber, and the barks and deep-sea ships from 700,000 to 950,000 and even 1,100,000 feet each. That is to say, every large ship requires the felling of from 150 to 250 trees which are from 100 to 250 years old, a growth which could not be replaced in the life-time of less than four generations. Not only are vessels larger, but there are more of them than there were two centuries ago; and the larger the vessels the heavier the scantling in proportion, and more timber is used in repairing and building them. Besides the wood consumed by the vessels themselves, a great quantity is cut annually for the building and repairing of wharves and piers in the harbors in which shipping is employed, and the trees cut for these objects are unfortunately the younger ones. The forests are thus being stripped of both large and small

trees. No opportunity is given them to recuperate, so that while the consumption of white oak is far greater in proportion to the number of vessels built than it was 200 years ago, the circumstances are also such that it is almost impossible to entertain the slightest hope of ever replacing the timber when it has finally been cut off.

Second only to white oak in importance in ship-building on the Atlantic coast is the yellow pine of the southern states. This tree is properly the yellow or long-leaf pine, and all from Virginia southward is of this variety. In the ship-yards it is called indiscriminately "pitch-pine" and "yellow pine"; but the yellow or pitch-pine of New Jersey is another variety. The southern pine is a tree from 60 to 80 feet in height, with a trunk from 2 to 4 feet in diameter and the grain coarse but compact and straight, and having far less sap-wood than the northern varieties, such as the pines of Virginia and New Jersey. The wood is heavy, strong, and rigid, is full of turpentine, and holds iron tenaciously, being also free from the acids which destroy an iron bolt. It does not grow much more than 100 miles inland from the sea-coast, but for at least that distance it forms almost an unbroken belt of timber from the southern boundary of Virginia all the way to Texas, skipping, however, the lower part of Louisiana. It has been cut off only along the course of the railroads and the rivers of the several states in which it is found. In Mississippi and Alabama the trees do not stand so thickly as in the other states, and are consequently larger and finer. The supply of this valuable timber is very great. It is used principally in the planking, ceiling, keelsons, water-ways, rails, and beams of vessels, and occasionally for decking and spars. Lower masts, with a core of oak and an outside of yellow pine, bolted and hooped together, are now commonly made for the large ships, and topmasts are frequently made of a single pitch-pine stick. The timber is cheap in the states in which it grows, and it is surprising that it is not utilized there for a great local ship-building industry. In a 2,000-ton ship, consuming 900,000 or 1,000,000 feet of timber, as now built in Maine, there is from 150,000 to 200,000 feet of oak, white pine, and hackmatack, and 750,000 or 800,000 feet of southern pitch-pine. It would be cheaper to freight the oak, white pine, and hackmatack to the south than to freight the vastly larger quantity of pitch-pine north. If the straight-grained pitch-pine can be used for frame timber, the whole ship could be built in the South at a large saving on northern prices, probably for from $35 to $40 per register ton. Builders and insurance companies seem afraid of pitch-pine frames, but possibly this is because the experiment has not been tried.

Next after pitch-pine the timber most valued by shipbuilders in this country is white pine. This valuable tree occupies common territory with other timber in the region extending from the valley of the Saint Lawrence to beyond the great lakes, and southward along the Alleghany Mountain system to the high ridges of Georgia. In old times the supply was immense. The trees are from 80 to 150 feet in height, those full grown being from 3 to 4 feet in diameter near the butt. The wood is soft, clear, free from knots, susceptible of a beautiful polish when worked, and extremely buoyant when placed in the water; but it is not strong enough for frame timber, and there is no record of its ever having been used for that purpose in this country. A few ships were built in England of white pine during the period of the greatest alarm there about the failure of the oak supply; but as these vessels lasted for an average of only three years, the experiment with that timber was not repeated.

White pine is most suitable for decking and the construction of cabins, as also for masts and spars. Its value for the latter use has always been so great that in the early patents granted to the colonies the trunks suitable for masts were reserved to the crown. A surveyor of the woods was appointed, who was given a license to go into the forests and mark such trees as were suitable for naval use. In a general way, trees of a diameter of 24 inches and upward just above the butt were reserved for the king, and persons who should fell one of them without permission were liable to a fine of £100. It is noted by Hutchinson that a pine, which when felled and sawed into boards would be worth scarce twenty shillings, would bring £20 when sold for a mast. The cost of masts and spars in England in that period was high. The following were the prices of American pine delivered at the yards in England in 1770, obtained from an old history:

MASTS.			BOWSPRITS.			YARDS.		
Diameter.	Length.	Value.	Diameter.	Length.	Value.	Diameter.	Length.	Value.
Inches.	*Feet.*	£ *s.*	*Inches.*	*Feet.*	£ *s.*	*Inches.*	*Feet.*	£ *s.*
36	108	110 0	38	75	48 0	25	105	25 12
35	105	88 0	37	75	42 0	24	102	25 12
34	102	72 0	36	73½	36 0	23	96	20 8
33	99	56 0	35	70½	34 0	22	93	16 16
32	96	44 16	34	69	32 0	21	88½	14 8
31	93	35 4	33	67½	24 16	20	84	11 12
30	90	28 0	32	64½	23 4	19	81	9 4
29	87	22 8	31	63	20 16	18	76½	7 4
28	87	18 8	30	61½	16 0	17	73½	5 4
27	87	14 8	29	58½	12 0	.....	.....	.....
26	84	12 16	28	57	6 16	.....	.....	.....
.....	.....	.....	27	55½	5 7	.....	.....	.....
.....	.....	.....	26	52½	4 16	.....	.....	.....

In 1768, 36-inch masts were worth £153 each delivered at the king's yards in England. In 1789 the lower masts of a 90- or 74-gun war ship, made from spindles of hard wood hooped and bolted together, cost from £500 to £525 each, the topmast, single sticks, £50 each, and the maintop-gallant masts from £8 to £9. From these figures it will be understood what a boon to England was the discovery of the magnificent white-pine timber of the American coasts.

In order to encourage the importation of spars liberal bounties were granted by act of parliament, and there were annually shipped from Portland, Maine, Portsmouth, New Hampshire, and a few other New England ports an average of about fifty ship-loads of spar-timber per year until after the revolutionary war.

The white pine was one of the first trees to disappear from the New England coast, and it is now so nearly extinct that builders are obliged to depend upon sources of supply hundreds and even thousands of miles away. New Hampshire, Vermont, New York, Pennsylvania, Ohio, and Michigan have been successively resorted to, and within the last five years two cargoes of spars have been brought from Oregon. Pitch-pine spars are now being brought to New England from Georgia. There is no prospect that trees large enough for masts will ever again be raised in Maine. In New Hampshire, Vermont, and other northern states, and as far west as Michigan, the white pine is also practically exhausted, while in Michigan, Wisconsin, and Minnesota, where there are many very large pine trees in the mixed hard-wood forests, timber-cutting is going on so fast by means of saw-mills and other steam apparatus that the extinction of the big timber is now expected within the present generation. Professor C. S. Sargent, census expert in charge of the forestry investigation, reports that it is probable that the large specimens of white pine in Michigan, Wisconsin, and Minnesota will be totally exterminated within the next ten or twelve years. It has already become cheaper for the Maine men to make their masts from strips of yellow pine and oak, bound securely together with iron hoops, than it is to bring white-pine trees from the distant parts of the country in which alone they are at present found. Lower yards on large ships are now often made of two sticks spliced, and topmasts are made of yellow pine. Iron masts and yards are now being introduced.

The "hard-wood" supply of the eastern and middle states is also nearly exhausted. These woods, comprising beech, birch, maple, and chestnut, were extensively used during the early active building times, and are still used to some extent in the timbers, beams, and planking of vessels; but there is very little of that timber left, and it cannot now be relied upon as a resource of any value for the ship-building industry. It is true that a large area of primitive forest land exists in the northern part of Maine, covering from 12,000 to 14,000 square miles of territory. Professor Sargent says that the timber is principally black spruce, with some scattered second growth pine and scattering bodies of hard wood, of which the yellow birch and the sugar maple are the most valuable, and it is possible that the future construction of railroads may make this region a factor of some importance in the future of the shipping industry in Maine, but the prospect is that the northern forests of the state will not become accessible for many years to come, as the logs are too heavy to drive down the rivers, and there is now no other way of getting them out. It ought, perhaps, to be mentioned that there is much hard wood in the north of Michigan.

A good ship-building wood, which was not much used by the early builders but has been put into ships extensively of late years, is the larch, variously called "hackmatack" and "tamarack". The wood of this tree is light colored, tough, buoyant, and durable, and a large vessel built completely of this wood would carry at least 300 tons more freight than an oak-built ship. It is not strong enough, however, to be used in parts of ships exposed to stress, and the uses for which it has been found most valuable are for knees, stanchions, and top timbers. The hackmatack has the valuable peculiarity of being free from acids which will corrode iron bolts driven through it. It holds iron with a tenacious grip. In these respects it is far superior to oak, and on account of its buoyancy, tenacity, and durability nearly all the Atlantic ship-yards use it, when it can be obtained, in the tops of vessels, as the cargo-carrying power is slightly increased and the center of gravity of the ship is kept low. On the northern coast the larch is sometimes from 80 to 100 feet in height, with the trunk sometimes 2 and 3 feet in diameter, and always grows in the swamps. A considerable body of this timber exists scattered through the northern counties of Maine, but it is so far away from the railroads that it is inaccessible. The larch is a tree of quick growth. A tract of it once cleared off springs up again immediately, and in about ten or fifteen years' time the trees are large enough for knees for the smaller class of vessels. There is apparently no reason why larch may not be relied upon for a long period for the use to which it is now chiefly put.

Spruce, too, like all other forest trees of the north Atlantic coast, is fast disappearing. It has never been used within the limits of the United States to any great extent in ship-building except for the light spars of vessels, but in the Canadian provinces forests are found of coast-spruce strong, tough, and durable which have been extensively utilized for the construction of vessels. The timber is cheap, and a ship when built of it is a good carrier and of remarkable durability for one constructed of so soft a timber. A number of small vessels built in the eastern part of Maine have also been constructed largely of spruce, but that is believed to be the only locality in the whole of the United States where spruce has been so used. For the light spars of vessels this wood is invaluable, as it is as light as white pine or cedar and is elastic and strong. A great deal of it was exported in the colonial days to England, and even at the present time a large number of European vessels are supplied with spruce spars from America, but the timber is now scarce. The chief sources of supply are Canada, Maine, New Hampshire, Vermont, northern New York, and West Virginia. A system prevails in Maine of cutting only the large trees from the spruce woods, leaving the smaller ones; and as the tree is one of rapid growth, the woods can be profitably worked at intervals of from fifteen to twenty-five years.

One other ship-building wood grows upon the Atlantic coast in limited supply, and has been used to some extent for a hundred years. This is the live-oak of Florida, a timber so durable that a ship built of it would last a hundred years, but so heavy as to make its use undesirable. A great deal of this timber was utilized during the twenty years following 1840 in navy vessels, steam propellers, and large clipper ships, particularly in the bows and sterns. Two large vessels have been built on Long Island within the last five years with live-oak frames, but experience has proved that vessels into which this wood enters to any considerable extent are inferior cargo carriers. Live-oak vessels have, as a rule, changed hands faster than those built of any other wood. There is a good deal of this timber left in Florida, but no one wants it.

Speaking in a general way, it must be admitted that the supply of valuable ship-building timber on the Atlantic coast has been materially impaired by the past two centuries of steady pillaging; and it is diminishing now so fast that wooden ships are likely to rise materially in price in the course of the next twenty years. If relief is to be looked for from any quarter, it is probable that it will come from the far northwest, on the Pacific coast.

Washington territory and Oregon, west of the Cascade mountains, are covered with the heaviest continuous belt of forest growth now existing in the United States, and perhaps in the world. Perhaps the single exception to this remark is the magnificent redwood belt of the California ranges. Nine-tenths of the forests first named are the yellow or red fir. There is a valuable cedar and several varieties of pine are scattered among the firs; there are also hemlock, spruce, a poor quality of oak, and some laurel. The tide-land spruce of that region makes excellent knees, and the laurel supplies stem pieces and other parts of the ship for which hard wood is positively required. The fir is valuable for all the rest of the ship. The trees grow to gigantic size, being from 150 to 300 feet in height, with the trunk from 5 to 8 and even 10 feet in diameter. They grow so straight that the lumbermen often fail, even with the aid of a plumb-line, to discover the slightest deflection from a true perpendicular. The wood is lighter and coarser grained than white oak, but is as strong, elastic, and tough as oak, and when cut at the right season of the year is equally as durable.

This timber first came to the notice of the officers of the United States navy more than thirty years ago. One or two war vessels having been sent into Puget sound to protect the settlers from the Indians, the officers were captivated with the timber, growing as it did from the water's edge as far inland as the eye could reach, and running up even on the sides of the colossal peaks of the region. Word being sent to Washington that it seemed desirable to test the qualities of the wood for ship-building, Admiral Farragut caused a quantity of it to be sent to the navy-yard near San Francisco and special tests to be made, with a view to ascertaining the size of scantling required to construct a vessel of fir having the same strength as though it were built of eastern white oak. Specifications for the sloop-of-war Manzanita were prepared from the results of these experiments. The fir was tested both there and at various eastern yards and found to be a satisfactory material for wooden vessels.

The following is an extract from a report by Constructor George W. Much, of the United States navy, in January, 1879, to Rear-Admiral Rodgers, on this subject:

In compliance with bureau order of October 12, 1878, to furnish the information required in your letter of October 3, 1878, relative to amended specifications for building the screw-steamer Manzanita with the Atlantic coast wood crossed out, also whether the carbolized laurel in the yard schooner Freda remains perfectly sound, etc., I have the honor to report that upon the receipt of the order I instituted inquiries as to the best Pacific coast and other woods that could be obtained in San Francisco for ship-building purposes, and by the information received from old settlers, timber dealers, vessel-owners, ship-builders, shipwrights, and others conversant in timber and timber material, find from their experience that there is no material on this or the Atlantic coast better adapted for outside and inside planking, for keels, keelsons, clamps, bilge strakes, knees, and breast-hooks than the Washington territory yellow fir, or yellow Oregon pine. It has also been adopted for frame timber in all vessels built on the coast for the last ten years, and so far with good results, and I have therefore adopted it in the specifications.

The Washington territory yellow fir or Oregon yellow pine can be readily procured, free from sap or other defects, of any desired size up to 90 feet in length, is in strength fully equal to Atlantic coast white oak, and has fully the same tenacity to hold fastening, and never becomes iron sick as it does when corroded by the acid contained in white oak. The great length of the Washington territory yellow fir saves to the ship-builder in fastening butts and scarfs and gives greater elasticity to the hull, and consequently diminishes the danger of springing a leak. Owing to the straight growth of this timber, there are comparatively but few natural crooks, but by judicious and careful selection the proper growth or shape could be obtained from the larger trees, and, if they were not readily found, the sharper floors, futtocks, and hooks could be built in the same manner as those built at this yard for the United States schooner Freda. For mast and spar timber the Washington territory yellow fir has no superior. Shipwrights and ship-builders of this coast, from their experience in repairs to sail and steam vessels, fully indorse the lasting qualities of this wood. Innumerable instances might be given of vessels built on this coast constructed entirely of Washington territory yellow fir. Some of them built as early as 1857 are still remaining perfectly sound, strong, and staunch.

The length of the fir timber is a strong point in its favor, as from trees 300 feet in height sticks of any required length can be obtained, while on the Atlantic coast oak and hard wood cannot be bought of a greater average length than 45 feet. Plank and logs of 60 feet are costly and hard to get; on the other hand, in the yellow-fir region logs for keels, keelsons, and planking can be obtained of any length that the saw-mills can handle. Keel and keelson pieces from 110 to 120 feet in length are habitually used. In the transfer steamboat Solano, of 3,549 tons, built at Oakland in 1879 and 1880, keelson pieces were used 150 feet long and 24 inches square without a particle of sap, rent, or check, and sound, straight, and free from knots and defects of every kind. In the curved parts of frames no longer sticks can be employed than in the eastern yards, but in all the longitudinal pieces of the

ship, upon which the rigidity of the hull depends, the builders find it convenient to use stuff of an average length of 90 feet, and can get all they want of it without extra cost. The long stuff is preferred, because it gives strength and elasticity to the ship, and because it saves much labor in construction, owing to the fewer number of butts.

Professor Sargent says that any estimate of the actual amount of timber standing in the territory is scarcely possible with the existing knowledge of the country; but the area of the forests is enormous, and the quantity of timber to the acre is remarkable. One estimate of the quantity of timber standing, apparently an extravagant one, makes it equal to the whole amount of the wood cut in the United States from the first settlement down to the present time. An important fact about the Pacific fir is that it reproduces itself so fast in its rainy home that it can be made to last almost indefinitely.

A large number of coasting vessels have been built out of Pacific coast fir, and several ships have been constructed for the grain trade with Liverpool. There was a great difference in the length of time for which these vessels respectively lasted. Some speedily decayed, others were sound after twenty years' use, and builders were for a few years greatly puzzled to account for this phenomenon; but attention has been called of late to the time of year at which the timber for the different vessels was cut, and it is now believed that the trouble in the cases of early decay arose entirely from using summer-cut trees. Builders intend hereafter to select fall- and winter-cut timber for their vessels, and the experts of the Pacific coast believe that fir felled when the sap is out of the wood and salted after being put into the vessel will last as long as white oak.

The cost of fir will also have some bearing on the question of iron or wood as a material for sailing vessels. As long as it can be bought for $10 and $12 per thousand board feet or less than $25 or $30 a thousand, while iron costs anything like present prices, the wooden ship will be a cheaper vessel than one of iron.

The following is a statement of the specific gravities and weights of the ship-building woods of the United States, prepared for this report by Professor C. S. Sargent, of Brookline, Massachusetts, chief special agent in charge of forestry statistics of the census of 1880:

Woods.	Specific gravity.	Weight per cubic foot.	Woods.	Specific gravify.	Weight per cubic foot.	Woods.	Specific gravity.	Weight per cubic foot.
		Pounds.			*Pounds.*			*Pounds.*
White oak	0.7438	46.35	Live oak	0.9504	59.23	White laurel	0.6517	40.61
Pitch-pine of New England	0.4957	30.89	Chestnut	0.4504	28.07	Western white cedar	0.4623	28.81
[illegible] pine	0.4957	30.89	Locust	0.7333	45.70	Cedar of Puget sound	0.3796	23.64
Southern pine	0.6999	43.62	Rock maple	0.6827	42.53	Alaska cedar	0.4782	29.80
White pine	0.3842	23.94	Black sugar maple	0.6921	43.13	Southern cypress	0.4600	28.67
White cedar	0.3322	20.70	American beech	0.6883	42.89	Madeira wood	0.9533	59.41
Red cedar	0.4926	30.70	Yellow birch	0.6553	40.84	Horse-flesh dogwood	0.8734	54.43
Hemlock	0.4202	26.19	Southern poplar	0.3889	24.23	Mastic	1.0109	63.00
Hackmatack	0.6236	38.86	Yellow fir	0.5155	32.13			
Black spruce	0.4584	28.57	Redwood	0.4208	26.22			

These are the weights of absolutely dry woods; for woods used for ordinary industrial purposes an addition of from 10 to 15 per cent. should be made for moisture remaining in the wood. For ship timber the weights should be corrected by adding about 25 per cent. For instance, white oak partially seasoned weighs on the average 56 pounds per cubic foot, and yellow fir 42 pounds per cubic foot in the ship-yard.

Constructor Samuel H. Pook, of the United States navy, has supplied the following data of actual weights of woods in the ship-yards:

	Weight per cubic foot in pounds.
White oak	56
Pitch-pine	40 to 50
White pine	35
Spruce	33
Maple	40
Beech	49
Live oak	76
Hackmatack	42
Chestnut	36
Hemlock	30
Sycamore	35
White holly	47
White cedar	21
Red cedar	35
Cypress	31
Hickory	53

It is evident, from an inspection of this table, that small vessels have been and are being built on our coast good enough to rate as well as the average of similar Eastern built vessels; and furthermore, that they can be constructed here at a cost in gold *no greater than the present gold cost in New York*. This may seem to be a startling statement, but it will be seen from the letter of Henry Steers (hereinafter quoted at length), that the present cost of building vessels of 100 tons in New York is $115 currency, or $82.80 in gold; and of vessels of 200 tons $112 currency, or $80.64 gold. Now the four vessels, "Occident," "Arago," "Melancthon," and "Blanco," cost respectively only $77, $70, $84 and $75 in gold per ton. In the case of the Messrs. Simpson, who built these four vessels, it has been proven that *where vessel-building has been undertaken as a business*, experience will assert its usual advantages, as compared with the efforts of parties *building experimentally and at retail.*

In regard to the other vessels quoted, the variation in their cost is to be attributed to various circumstances. Those built in San Francisco have had to pay San Francisco prices for lumber. Those built at Puget Sound, Humboldt and Umpqua, have been put to great inconvenience and expense on account of the necessity of ordering all iron work, sails, rigging, oakum and material, except the lumber, from this city. In nearly all cases, each vessel has been the first one built by the party constructing her, whereby each builder has been laboring under the disadvantages always attendant on a first attempt. In consequence of these difficulties many of our coast-built vessels have cost much more than they ought, while they do not rate as high as they should, on account of defective fastening; and a good many jobs of refastening have been rendered necessary on that account. Further allowance must be made for the fact that want of funds has been a great obstacle with many enterprising builders, who have been unable for lack of capital to turn out as good work as they otherwise would. The growth of the business has also been hindered by grave doubts as to the strength and durability of our firs when used as ship timber. The predilections of all American and English shipwrights are naturally for oak; but oak has been scarce, or rather the oak of this coast has generally been found worthless for these purposes, while only the laurel has been found suitable as a substitute for it. Sufficient time has, however, elapsed to prove to us that we have several kinds of ship timber in the greatest abundance, and of a size and quality in every way better adapted for ship building than the timber used for many years back on the coast of Maine or the British Provinces.

SHIP TIMBERS.

RED AND YELLOW FIR.—These trees, which constitute about one-half of the dense growth of timber of Oregon and Washington Territory, have become celebrated throughout the world for their magnificent proportions and the serviceable qualiry of the spars and lumber supplied from them. They frequently furnish sticks 150 feet long, 18x18 and even 24x24 inches square, without a particle of sap, without a rent or check, perfectly sound and straight. Planks of this timber, 60 and 90 feet long are readily obtainable, thus avoiding the necessity for more than one-third to one-half as many butts or scarphs in a ship's sides, decks, or fore-and-aft timbers as are required in Eastern or European vessels. As to the strength of these woods many mechanics think it fully equal to that of Eastern white oak, and they all agree that if oak be stronger, nothing is easier than to use enough more of our fir to make up the difference in strength. In some other respects the fir has the advantage over oak. It contains just enough pitch to enable it to hold iron fastenings with a tenacity so great that bolts and spikes will generally break before they will draw out of it. Iron never becomes "sick" when imbedded in it, as it does when corroded by the acid which saturates all kinds of oak. As to its durability, we know that although it has not yet been tested as the sole material of a guano or pepper ship, yet it has been extensively used for new timbers, planking, ceiling, decks, keelsons and stancheons, in

large vessels repaired on the coast; it has been the sole material used in building our coasting and river schooners; it has built the "Chrysopolis," "Yosemite," "Capital," "Geo. S. Wright," "John T. Wright," and many other river steamers. It has been used in doubling and rebuilding all the old ocean steamers on this coast, and *we have never yet met a ship-master or a ship-carpenter who, during our fifteen years of this kind of experience, has complained of its want of durability.* Surely this experience has gone far enough to prove to us that this timber is much better than the beech, maple and spruce of the Eastern coast, and better than their hackmatack in its greater size, and the larger number of uses to which it can be put in ship-building.

This timber can be furnished in exhaustless quantities at every mill on Puget Sound, on the Columbia river and at every lumber port on the northern coast, at $10@$12 per thousand feet (board measure), in gold, inclusive of all mill work necessary in dressing and preparing it for ship-building.

These trees also furnish the best of knees and natural crooks when they can be procured. It is, however, difficult to obtain them, because the tap roots make the task of digging the stumps laborious and troublesome.

Tide-land Spruce.—This tree is also abundant in many parts of Washington Territory, Oregon and Alaska. It resembles the hackmatack of the Eastern States, and is particularly suitable for top timbers and natural crooks. Knees and breasthooks of almost any size can be procured from it; indeed, it is our principal dependence for these portions of a vessel's frame, on account of its spreading its roots flat on the surface of the ground. The durability of this wood is believed by mechanics to be about the same as that of hackmatack. It holds iron fastenings remarkably well, and grows to a size sufficient for all ship-building purposes.

Yellow Cedar.—This tree is undoubtedly the most valuable of all our trees for ship-building. It is found in

great quantities at Coos Bay, thence along the coast of Oregon to Port Orford; also, on the islands and main land of Alaska. The Indians of the latter territory have for ages used its trunk for their canoes. A vessel built of it at Sitka, thirty years ago, was recently examined, five years after she was wrecked, by the officers of the Revenue steamer Lincoln, and the timbers appeared as sound and perfect as on the day she was launched. This cedar is much finer grained, handsomer, more dense, and a better timber in all respects than any other cedar known. It grows to a height of 175 feet, with a diameter of four feet. It is probably the finest material for decks in the world. At Coos Bay, Mr. A. M. Simpson informs us that there are inexhaustible quantities of this cedar, which has been used to some extent in the construction of the bark "Melancthon." After fifteen years use in the frame of his sawmill it shows no signs of decay. Mr. Simpson expresses the confident opinion that heart cedar, cut from the lower part of this tree, will outlast teak in any part of a ship's frame.

White Cedar.—This tree, the common cedar of the Eastern States, is found abundantly on the mountains in Washington Territory. It possesses here the same qualities as elsewhere, and is just as suitable for ship-building, and just as durable here as at the East. Logs of it have been found at Puget Sound under the roots of living trees four feet in diameter, yet remaining perfectly sound; showing that after two or three hundred years, it betrays no signs of decay.

Oak.—The oaks of this coast have been generally found unfit for ship-building, or indeed for any other mechanical purpose; yet we are informed that a sufficient amount of good oak can be procured about Puget Sound for stems, stern-posts and other portions of ship's frame, especially if the timber be "docked" a long time before using it. Judge O. L. Shafter, late of the Supreme Court, who is largely interested in the Point Reyes Rancho, informs us that a variety of oak is found in great abundance about Bodega

and Tomales, which is just as good for every mechanical purpose as the best Connecticut pasture oak—that it grows to a sufficient size for ship-building, furnishes a great number of natural crooks, and is tough enough to make axe helves or wagon material. As Bodega and Tomales are good harbors, and of easy access, there is no reason why this material could not be delivered at any point on the coast at a very moderate expense.

Laurel.—Considerable quantities of this timber are found on the northern coast range of California, and throughout Oregon and Washington Territory. Sticks of 50 to 60 feet long may be frequently found large enough for keels and keelsons. It makes excellent material for stancheons, stems and stern-posts, rudder-stocks, aprons, fife-rails and cabin finishing; for which latter purpose it is pre-eminently fitted from its beautiful colors and susceptibility of taking a high polish. Its durability, however, when put into a ship's frame between wind and water, has been questioned, and it has not been used extensively or long enough to settle this point definitely. Those who are best qualified to judge believe that when cut at the proper time of year, and well seasoned before using, there will be no trouble about its durability.

Locust.—No country in the world is better adapted than California to the growth of the locust, that most valuable of woods for treenails, stancheons, and many other portions of a ship's frame—though we are not aware that any one has yet been far-seeing enough to undertake large plantations of this tree. The fact of its thrifty growth, wherever it has been cultivated as a shade tree, has been abundantly proven throughout the length and breadth of California, especially in the warm valleys of the interior. Were it not for the oppressive fence laws which compel our farmers to forego all the varied production that tillage would otherwise develop from the millions of acres now sacrificed to the imaginary rights of a few owners of sheep and wild cattle—the mere cost of locust seed and planting it would in twenty years begin to return a revenue in ship timber of a thousand per cent. per annum on the investment; and that revenue would go on increasing from year to year as the timber increased in size, and the young trees replaced those that might be removed. Who ever first plants a large locust grove where cattle cannot destroy the young trees, will leave a munificent fortune to his heirs, should he not live long enough to enjoy it himself.

Foreign Woods.—If it should, however, be found that none of our present coast woods are suitable for those portions of a ship's frame usually constructed of hard wood, there is no doubt that we can import the teak from India, or the koah wood from the Sandwich Islands, or the mahogany from Central America and Mexico, or oak from Australia, as cheaply as foreign woods are now imported into Great Britain for ship-building purposes; provided the transportation be effected in suitable vessels and on a large scale. We should be no worse off in this respect than the ship-builders of New York, Boston or Maine, nearly all of whose timber is now procured from a great distance.

Iron—Has lately begun to be produced near St. Helen's, Oregon, from a mine said to be inexhaustible, and yielding an ore so rich, that we are informed that shoe shapes may be hammered out, or castings made at the furnace from the first melting. This mine is surrounded by exhaustless material for charcoal. It is owned by men of large capital and enterprise, who will doubtless soon be able to produce iron of every description below the present cost of importation.

Copper.—The large development of copper mines in this State, requiring many thousand tons of shipping annually for several years past to convey the ore to Swansea or Boston for reduction, is a fact too familiar to need comment from us. It is, however, somewhat remarkable that, in view of the considerable consumption of manufactured copper on our coast, it should be found cheaper to pay two freights and one duty on the article than to import some skilled persons from the ports mentioned to show our capi-

talists how to work up our own raw material. If this were accomplished, the supply of copper our State is capable of yielding ought to render it cheap enough for extensive use in ship-building; in facte heaper than in any other port in the United States.

Pitch, Tar, Turpentine and Rosin.—During the first years of the late war, the high prices of these articles stimulated several parties to attempt their production, both in this State and in Washington Territory. The result was a finer article of pitch and rosin than any ever imported from the Carolinas or Stockholm, and the discovery that if there was a larger demand, both of these articles, and also a fine quality of turpentine can be produced in any quantity, and at prices below the cost of importation, almost at the ship-yards themselves. Single trees are frequently met with on Puget Sound, whence from two to ten barrels of crude pitch can be drawn at one tapping. The Sugar Pine of California also yields a superior article of pitch and rosin.

Coal—Of a quality resembling anthracite is found at a mine a few miles from Seattle, on Puget Sound. The principal article of export from Coos Bay and Bellingham Bay, is coal of a quality sufficiently good for all purposes connected with ship-building; and it can be furnished at the yards adjacent at much less than New York or Boston prices.

Linseed Oil—Is now being constantly manufactured at the oil mill in this city, at prices low enough to command the market.

Cordage and Oakum—Can be supplied here in any quantity, and at prices below the cost of importations by the San Francisco Cordage Factory—an establishment that has for twelve years past supplied a large portion of the Manila rope used on this coast. We are not aware that this establishment has yet undertaken the manufacture of tarred rigging, but there can be no doubt that, as soon as our farmers have made up their minds to raise hemp—for which

many parts of our State are specially adapted—this, or some similar ropewalk will be able to supply all the tarred rigging required on this coast for both new and old vessels.

Spars.—Since Puget Sound has for years supplied several British and French ports, China and Australia, with the finest spars in the world, it is needless for us to allude to this important item, except to remark, that in nearly all the prominent ship-yards of the old world a heavy freight has to be paid on spars, because they require vessels of large size to be injured for other purposes by the cutting of bow-ports; while the bulky nature of the cargo requires a long time for loading and discharging. All this is wholly saved at Puget Sound and at all other of our lumber ports, where the finest of spars can be procured in immense quantities for the mere cost of cutting and towing them to the yards.

CORRESPONDENCE.

In September last, your committee addressed letters to several prominent ship-builders at Boston, Bath, Newburyport, and New York, of which the following is a copy:

Dear Sir:—Considerable attention having been hitherto bestowed by parties on our coast interested in shipping, to the building of small vessels, of the fir and cedar timber so abundant in the Pacific States, the Board of Marine Underwriters of San Francisco have appointed a Committee to procure all possible information touching the cost of ship-building generally on our coast as compared with Eastern ship-yards, with a view to offering encouragement to the construction of vessels of large burthen suitable for our grain trade. Premising that we have here only two varieties of fir, and two of cedar, but very little oak or other hard wood suitable for ship-building, and that we are now satisfied that a vessel can be built as strong and durably of our firs and cedars as of the "mixed woods" latterly used in Maine, we now ask of you information on the following points:

1st. At what cost per ton (new measurement) can you

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has a Virginia white oak frame, Georgia pine plank, ceiling, keelson, beams, stanchions and decks. Her masts are single sticks of Oregon pine; the fore and main masts are twenty-nine inches and the others twenty-eight inches diameter. She is a good sample of the large wooden coaster, but not quite so large as the six-masters or the largest of the five-masters. On these vessels experience teaches that forty-five-foot booms are as long as can be conveniently handled and about seventy-five feet is long enough for the spanker boom. The lower sails are made of the heaviest duck that can be sewed together, No. 2–0. They are fitted with reefs but it is only in case of an emergency that a sail is reefed, except occasionally the spanker. If you never handled a wet piece of 2–0 duck, try it, and you will realize the difficulty. The recent America Cup defenders had mainsails of this weight duck and only in two instances was a reef actually tied in. The Vigilant sailed one race against Valkyrie with a reefed sail and very nearly lost it. But she had a crew of fifty men and the reef was taken while at anchor.

The construction of wooden vessels has varied but slightly during historic times. White oak has always been used when it was procurable for keel, frames, ceiling, plank and beams, in fact, for the whole structure except the deck and deck erections, where pine has been almost always employed. Recently mahogany and teak have been imported from the tropics for all deck erections and frequently entire decks are now made of this material. Oak has become scarce and the price has increased enormously in the last one hundred years, and this has led to the substitution of other woods for plank, beams and ceiling, and even for the frame. Georgia pine is now universally used for plank, ceiling, keelsons and beams in the large cargo vessels built in New England. In New Brunswick and Nova Scotia many successful schooners and even ships have been constructed entirely of spruce, but for the largest vessels as now built, spruce would not be suitable because of the comparatively small size of the timber.

On the Pacific they build all classes of sailing vessels entirely of Douglas fir or, as we call it, Oregon pine. The frames are somewhat larger than with us but are molded out of straight grained timbers with occasionally a little crooked root knee stock at the turn of the bilge. Where built close to the standing timber they often use plank and keel and keelson pieces of over one hundred feet long which is not only economical but produces a very rigid structure. These vessels are durable if the timber is felled at the right season of the year, and it seems probable that large wooden ships

from Crowninshield, B.B. "Wooden sailing ships." (See CATALOGUE for full info.)

will be built on the Pacific coast long after they have ceased to be built in the East, until, in fact, the easily accessible timber is all cut away.

Fishermen and small coasters of less than 200 tons in the New England and Middle Atlantic States are still usually strictly oak-built; that is, have white oak keel, frame, planking, beams, stem and stern post, but even in this class Georgia pine plank is now occasionally used. White oak has the preference but sometimes it is hard to get and frequently it is of poor quality. An oak trunk that is cut several years after the tree has died produces brittle wood and is frequently full of worm holes, and yellow pine of good quality is much to be preferred.

The planking of wooden ships is still fastened with oak or locust treenails (on the Pacific there is no locust and but little oak and they use a mountain laurel with good results). Two hundred years ago treenails were used also for the deck, knees, and somewhat for the keel, stem and deadwoods as well. Iron was expensive, and easily corroded by sea water: whereas timbers of as large siding capable of safely taking the treenail holes were cheap.

Where the timber is large enough there is something to be said in favor of treenails. The bearing area on the plank is large and well resists the pressure caused by "hawsing home" the calking in the seams.

The treenails, too, are usually as durable as any part of the structure. But now that the price of iron is so low, and the art of protecting it by galvanizing is so cheaply and successfully accomplished, it is only the extreme conservatism of the builders that has prevented the introduction of spikes for the plank as well as for the ceiling and decks. Plate 21 shows the deck frame of a fisherman and illustrates the regulation way of "Kneeing off" the beams and arranging the supplementary beams or "carlings" as they are erroneously called.

The "wooden walls" have served a great purpose in the advancement of civilization. They are still here, to some extent, but their death knell has been sounded.

Plates 18, 19, and 20 show the lines, sail plan, and the construction plan of the Boston fisherman Tartar designed by the author for the Easting Fishing Co. of Boston. She is a vessel with a sharp floor and long but full water-lines and with her profile fairly well cut away at each end; her keel has a pronounced drag. She is buoyant and able, maneuvers and steers well. These vessels are at sea three-quarters of the time, winter and summer, as the fishing is now conducted, and often have to keep the sea in the worst weather for weeks at a time. The skippers tell extravagant